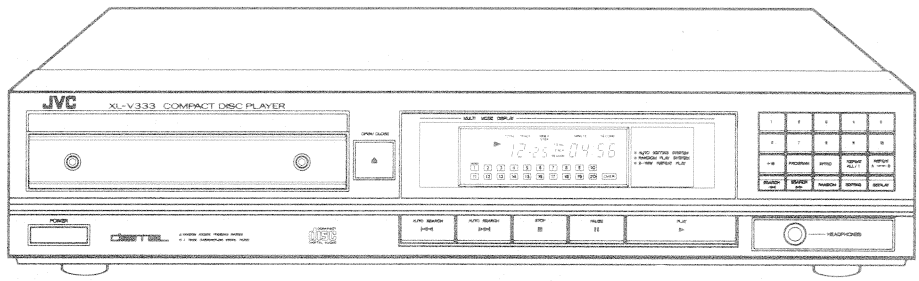
XL-V333BK

JVC

SERVICE MANUAL

COMPACT DISC PLAYER

MODEL NO. **XL-V333BK**



COMPACT disc DIGITAL AUDIO

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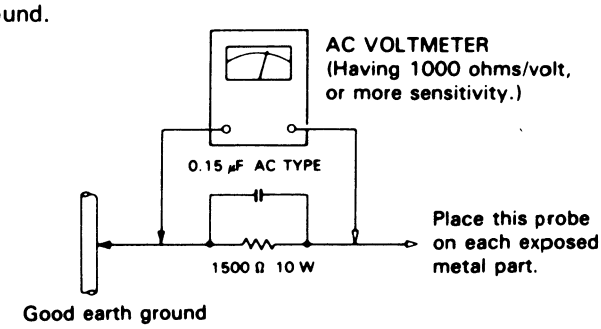
No. 20054
May 1988

Safety Precautions

1. The design of this product contains special hardware and many circuits and components specially for safety purposes. For continued protection, no changes should be made to the original design unless authorized in writing by the manufacturer. Replacement parts must be identical to those used in the original circuits. Service should be performed by qualified personnel only.
2. Alterations of the design or circuitry of the product should not be made. Any design alterations of the product should not be made. Any design alterations or additions will void the manufacturer's warranty and will further relieve the manufacturer of responsibility for personal injury or property damage resulting therefrom.
3. Many electrical and mechanical parts in the product have special safety-related characteristics. These characteristics are often not evident from visual inspection nor can the protection afforded by them necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in the Parts List of Service Manual. Electrical components having such features are identified by shading on the schematics and by (⚠) on the Parts List in the Service Manual. The use of a substitute replacement which does not have the same safety characteristics as the recommended replacement part shown in the Parts List of Service Manual may create shock, fire, or other hazards.
4. The leads in the products are routed and dressed with ties, clamps, tubings, barriers and the like to be separated from live parts, high temperature parts, moving parts and/or sharp edges for the prevention of electric shock and fire hazard. When service is required, the original lead routing and dress should be observed, and it should be confirmed that they have been returned to normal, after re-assembling.
5. Leakage current check (Electrical shock hazard testing)
   After re-assembling the product, always perform an isolation check on the exposed metal parts of the product (antenna terminals, knobs, metal cabinet, screw heads, headphone jack, control shafts, etc.) to be sure the product is safe to operate without danger of electrical shock.
   Do not use a line isolation transformer during this check.
   - Plug the AC line cord directly into the AC outlet. Using a "Leakage Current Tester", measure the leakage current from each exposed metal part of the cabinet, particularly any exposed metal part having a return path to the chassis, to a known good earth ground. Any leakage current must not exceed 0.5 mA AC (r.m.s.).
   - Alternate check method
     Plug the AC line cord directly into the AC outlet. Use an AC voltmeter having 1,000 ohms per volt or more sensitivity in the following manner. Connect a 1,500 Ω 10 W resistor paralleled by a 0.15 μF AC-type capacitor between an exposed metal part and a known good earth ground.
     Measure the AC voltage across the resistor with the AC voltmeter.
     Move the resistor connection to each exposed metal part, particularly any exposed metal part having a return path to the chassis, and measure the AC voltage across the resistor. Now, reverse the plug in the AC outlet and repeat each measurement. Any voltage measured must not exceed 0.75 V AC (r.m.s.). This corresponds to 0.5 mA AC (r.m.s.).


AC VOLTMETER
(Having 1000 ohms/volt, or more sensitivity.)
0.15 μF AC TYPE
1500 Ω 10 W
Place this probe on each exposed metal part.
Good earth ground

Warning

1. This equipment has been designed and manufactured to meet international safety standards.
2. It is the legal responsibility of the repairer to ensure that these safety standards are maintained.
3. Repairs must be made in accordance with the relevant safety standards.
4. It is essential that safety critical components are replaced by approved parts
5. If mains voltage selector is provided, check setting for local voltage.

Important for Laser Products

1. CLASS 1 LASER PRODUCT
2. DANGER: Invisible laser radiation when open and interlock failed or defeated. Avoid direct exposure to beam.
3. CAUTION: There are no serviceable parts inside the Laser Unit.
4. CAUTION: Do not disassemble the Laser Unit. Replace the complete Laser Unit if it malfunctions.
5. CAUTION: The compact disc player uses invisible laser radiation and is equipped with safety switches which prevent emission of radiation when the drawer is open and the safety interlocks have failed or are defeated. It is dangerous to defeat the safety switches.
6. CAUTION: If safety switches malfunction, the laser is able to function.
7. CAUTION. Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

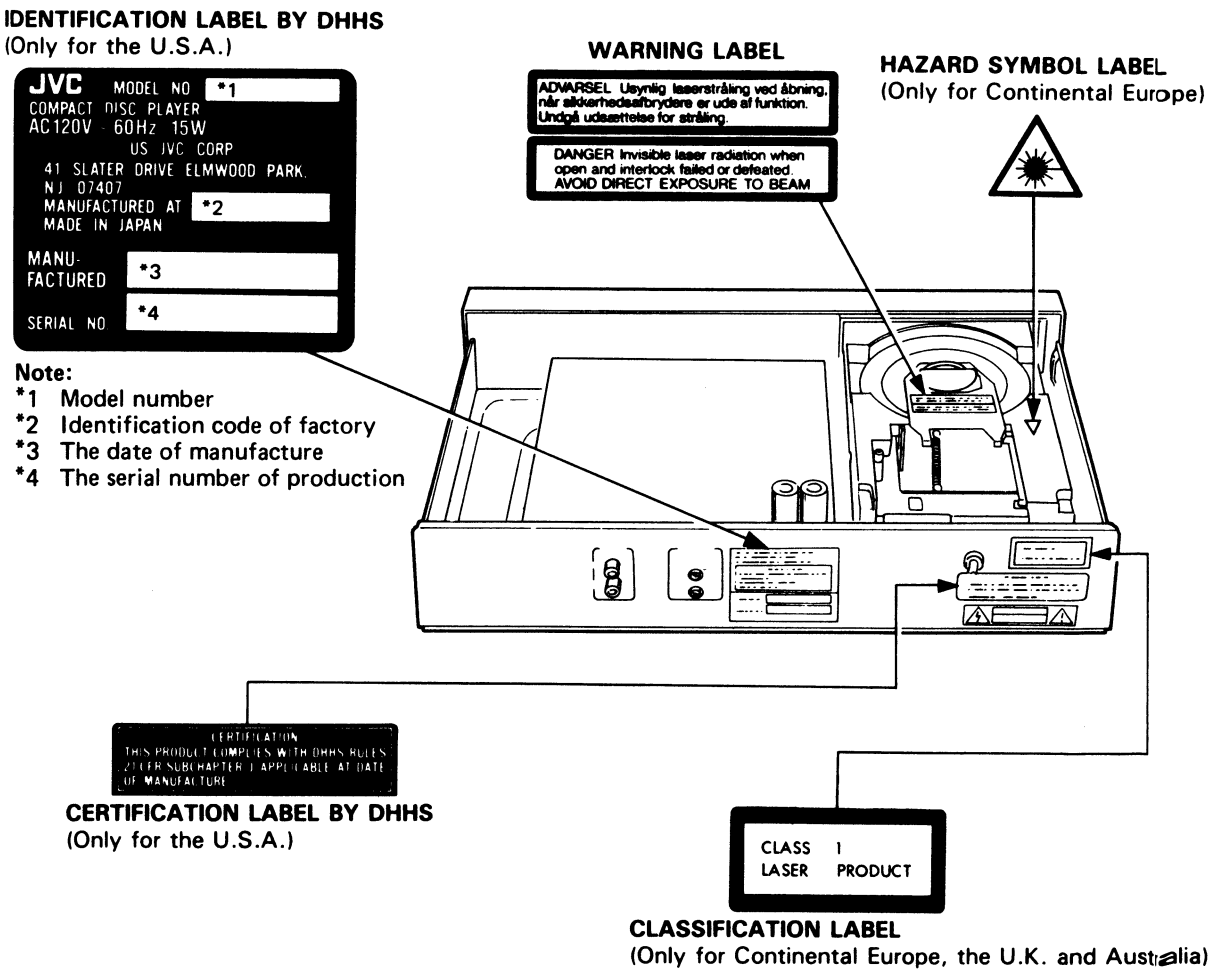
VARNING: OSYNLIG LASERSTRÅLNING UPPSTÅR VID KOMPONENTENS ÖPPNING NÄR SÄKERHETSBRYTAREN ÄR FRÅNSLAGEN.

ADVARSEL: USYNLIG LASERSTRÅLING VED ÅBNING, NÅR SIKKERHEDSAFBRYDERE ER UDE AF FUNKTION.
UNDGÅ UDSÆTTELSE FOR STRÅLING.

ADVARSEL: USYNLIG LASERSTRÅLING VED ÅPNING NÅR SIKKERHETSBRYTEREN ER AVSLOTT.
UNNGÅ UTSETTELSE FOR STRÅLING.

VAROITUS: LAITE SISÄLTÄÄ LASERDIODIN, JOKA LÄHETTÄÄ (NÄKYMÄTÖNTÄ) SILMILLE VAARALLISTA LASERSÄTEILYÄ.

REPRODUCTION AND POSITION OF LABELS


IDENTIFICATION LABEL BY DHHS
(Only for the U.S.A.)
JVC MODEL NO *1
COMPACT DISC PLAYER
AC120V 60Hz 15W
US JVC CORP
41 SLATER DRIVE ELMWOOD PARK.
NJ 07407
MANUFACTURED AT *2
MADE IN JAPAN
MANU-FACTURED *3
SERIAL NO *4
Note:
*1 Model number
*2 Identification code of factory
*3 The date of manufacture
*4 The serial number of production
WARNING LABEL
ADVARSEL Usynlig laserstråling ved åbning, når sikkerhedsafbrydere er ude af funktion. Undgå udsættelse for stråling.
DANGER Invisible laser radiation when open and interlock failed or defeated. AVOID DIRECT EXPOSURE TO BEAM
HAZARD SYMBOL LABEL
(Only for Continental Europe)
CERTIFICATION
THIS PRODUCT COMPLIES WITH DHHS RULES 21 CFR SUBCHAPTER J APPLICABLE AT DATE OF MANUFACTURE
CERTIFICATION LABEL BY DHHS
(Only for the U.S.A.)
CLASS 1
LASER PRODUCT
CLASSIFICATION LABEL
(Only for Continental Europe, the U.K. and Australia)

DESCRIPTION AND FUNCTIONS

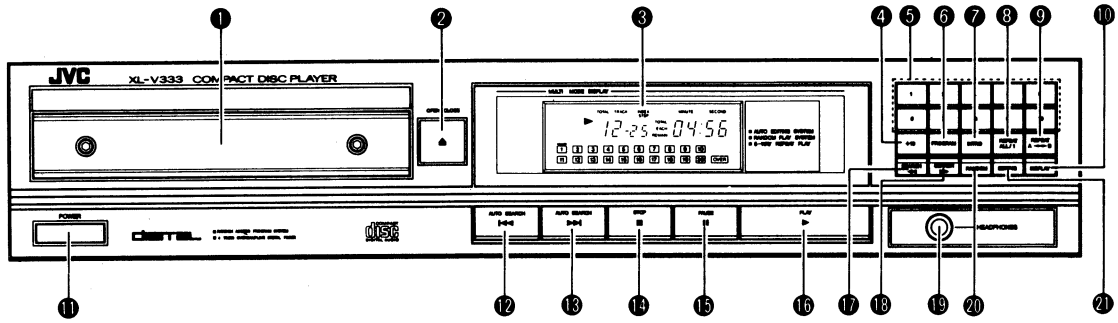


Fig. 5

❶ Disc platter
Load the disc to be played.

Notes:
- **While the disc platter is moving in or out, do not turn the power off or push or pull on the disc platter by hands etc. because a malfunction may occur.**

❷ OPEN/CLOSE (⏏)
Press to move the disc platter in and out. Press once and the disc platter will move out; now you can load a disc. Press again to move the platter back in. The disc is now ready to be played.
If it is pressed during play, play will be interrupted. And the program will be erased from memory and the disc platter will come out.

❸ Display window (MULTI MODE DISPLAY)
This shows the total number of selections on the disc, the total playing time, the elapsed playing time, the remaining playing time, various program data, etc. For more details, see "DISPLAY" on page 23.

❹ +10
Use this button to designate track numbers greater than 10 or establish the time interval. For details, refer to "10 key operation buttons".

❺ 10 KEY OPERATION
To designate the desired track numbers or establish the time interval during the tape editing, use these buttons. If the desired number is 10 or less, use the [1] ~ [10] buttons. However, to assign a track number greater than 10, use the [+10] button and the [1] ~ [10] buttons.

Examples ([1] ~ [10] buttons)
1. To assign the 25th track, press the [+10] button twice then press the [5] button.
2. To assign the 30 minutes, press [+10] button twice then press the [10] button.

❻ PROGRAM
To program the sequence of the selections to be played, press this button while the CD player is in the standby mode when the disc platter is not loaded. The PROGRAM indicator lights and up to 32 selections can be programmed.

❼ INTRO
Press this button to monitor the desired selections by hearing the first 15 seconds of individual selections. When this button is pressed in the standby mode, play starts in order from the first selection (or from the first programmed selection) and continues playing the first 15 seconds of each selection (or each programmed selection) to the end.
When you want to hear the full-length play of such selection, press the [INTRO] button while you are hearing it. The introduction mode will be released and normal play will starts.

❽ REPEAT ALL/1
Press this button to play one selection, all the selections, or the programmed selections of the disc repeatedly.
When desiring all the selections, press the button once and play starts. "ALL" and "REPEAT" will be lit in the display window. When desiring one selection, press the button twice and pay will start with "1" and "REPEAT" lit in the display window.
To release this repeat play, press the [REPEAT ALL/1] button again.

❾ REPEAT A ↔ B
To play a certain section of the disc, press this button during play or pause mode.
Press this button at the point where you want the play to start, and "A –" will light in the display window. Press this button again at the point where you want to end play, and "A – B" will light in the display window. Play will then start between the A and B points.
To release this repeat play, press the [REPEAT A ↔ B] button again or press the [REPEAT ALL/1] button.

❿ DISPLAY
This button changes the time data in the display window.
Each time this button is pressed, the indication changes as follows:
EACH → EACH REMAIN → TOTAL → TOTAL REMAIN
For further detail, see "Display" on page 25.

⓫ POWER
Press to turn on the power, the display will light. Press again to turn the power off. The display will go off.

⓬ AUTO SEARCH (⏮)
Press this button to locate the start of the current selection or to go back to the previous selection during play. Play will go back one selection each time the button is pushed. If the button is held down, play will continue to go back one selection at a time until the button is released.

⓭ AUTO SEARCH (⏭)
Press to go to the start of the next selection. Every time this button is pressed, the pickup goes forward by one selection. Holding the button down moves the pickup forward continuously.

⓮ STOP (■)
Press to stop play.
A few seconds after the disc has stopped rotating, the player goes into the stand-by mode with the track number "1" shown in the display window. The player is then ready to play.

⓯ PAUSE (⏸)
Press to suspend play temporarily; the optical pickup stops and the disc continues to rotate. This status is called the pause mode.

⓰ PLAY (▶)
Press to start play.
If disc platter is out; press this button, the disc platter will then move in and play will start (without pressing the [OPEN / CLOSE (⏏)] button).

⓱ SEARCH (◀◀)*
Press this button while in the play or pause mode to scan backwards. When this button is pressed continuously, the CD player will the backward-search slowly for about 3 seconds, and then to into a higher speed search.

⓲ SEARCH (▶▶)*
Press this button while in the play or pause mode to scan forward. When this button is pressed continuously, the CD player will forward-search slowly for about 3 seconds and then go into higher speed search.

* When pressing the [SEARCH (◀◀)] or [SEARCH (▶▶)] button during play, you can hear slight sound reproduction. With this sound, you can monitor your selections.

⓳ PHONES
Insert the headphones plug into this jack.

⓴ RANDOM
To play selections of the disc at random, press this button.

㉑ EDITING
When editing the disc data in the cassette tape, the time interval can be established in advance in accordance with the tape length. When this button is pressed, "EDITING" appears in the display window for about 4 seconds. During this period, establish the time interval with the 10 key and [+10] key operation buttons.

DISPLAY (MULTI MODE DISPLAY)

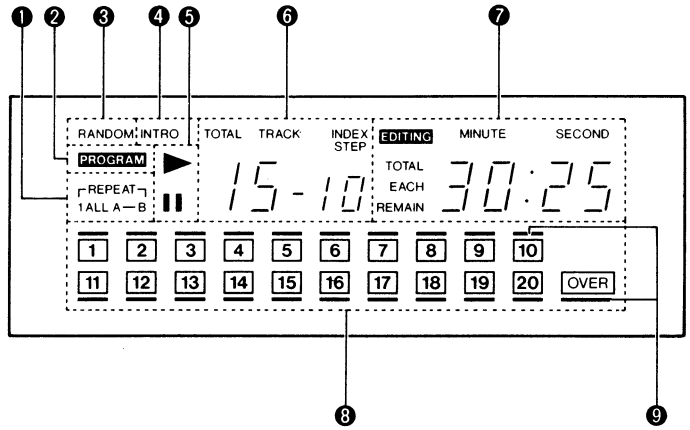


Fig. 6

❶ REPEAT
Lights when the repeat play is ready.
1:
Lights when the repeat play of only one selection is entered.
ALL:
Lights when the repeat play of all the selections is entered.
A — B:
Lights when the repeat play between A and B is ready.

❷ PROGRAM
Lights when selections are ready to be programmed.

❸ RANDOM
Lights during random shuffle play.

❹ INTRO
Lights when the first 15 seconds of individual selections are played.

❺ PLAY/PAUSE indicators
▶ : Lights when the [PLAY (▶)] buttons is pressed.
❚❚ : Lights when the [PAUSE (❚❚)] button is pressed.

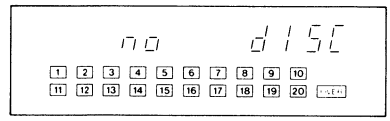
❻ TRACK/INDEX/STEP
TOTAL TRACK:
Lights when all the selections of the disc are shown.
TRACK:
Shows the programmed selection numbers or the current selection number of the disc.
INDEX:
Shows index numbers.
STEP:
Shows the numbers of memory steps of the programmed selections.

❼ TIME INDICATOR
Each time the DISPLAY button is pressed, the indication changes in the following order.
EACH, EACH REMAIN, TOTAL, and TOTAL REMAIN
EACH:
Shows the elaps time of each selection.
EACH REMAIN:
Shows the remaining playing time of each selection. (Shows nothing when replaying a selection after the 32nd selection.)
TOTAL:
Shows the elapsed playing time of the disc or the programmed selection.
TOTAL REMAIN:
Shows the remaining playint time of the disc or the programmed selections.
MINUTE:
Shows the total playing time, elapsed playing time, or remaining playing time in minutes.
SECOND:
Shows the total playing time, elapsed playing time, or the remaining playing time in seconds.
EDITING:
Lights when performing edit recording or establishing the time interval (about 4 seconds).

❽ Program Chart
This Chart indicates the number of each selection on the disc. When a selection is programmed, " ☐ " which surrounds the selection number lights. If the disc contains more than 20 selections, "OVER" lights. When this occurs, you can determine confirm the total number of selections by the TOTAL TRACK.

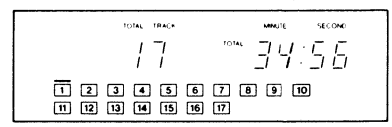
❾ – Mark
This mark (red) indicates the number of the current selection. Thus it can be used to scan or program the desired selection.

■ When the disc is inserted upside down or is not loaded, "no disc" appears, as shown below.

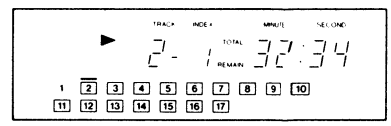


■ **Example of indications**

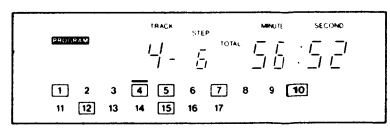
- When the total playing time of a disc with 17 selections is 34 minutes 56 seconds.



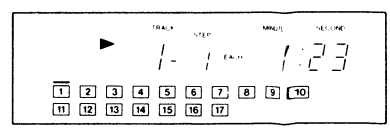
- When the remaining time is 32 minutes 34 seconds when the second selection is playing.



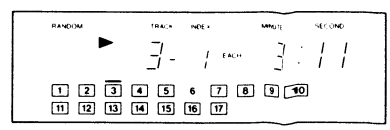
- When the forth selection is programmed sixth and the total playing time is 56 minutes 52 seconds.



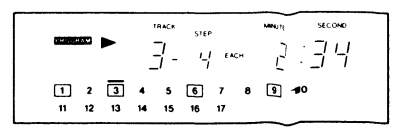
- When 1 minute 23 seconds has elapsed with the first selection playing.



- This is the case where the sixth selection was played first and the third selection next by the random shuffle play.



- When the elapsed time of the third selection which is programmed fourth is 2 minutes 34 seconds.



HOW TO OPERATE

Preliminary Operation

1. Turn on and adjust components such as an amplifier to play selections on the CD player.
2. Turn on the CD player, the display window will light up.
3. Press the [OPEN / CLOSE (⏏)] button to slide the disc platter out.
4. With its label side up, load a disc on the CD player.

To Play From the First Selection to the Last Selection of the Disc

5-1. Press the [PLAY (▶)] button, and the indicator on this display blinks. At the same time the disc platter is automatically loaded and play of the first selection of the disc is started. Upon start of play, the indicator on this display stops blinking.

5-2. When the [PLAY (▶)] button is pressed after the [OPEN / CLOSE (⏏)] button has been pressed, play is also started with the first selection of the disc. When this occurs, the display shows the number of tracks and total playing time of the disc for 3 seconds, immediately after the disc is loaded. However, the display shows nothing if the [PLAY (▶)] button is pressed before these data appear in the display window.
During play, the (▶) indicator will be lit, and the track number and elapsed time of the current selection are shown in the display window. When the play of all the selections ends, the CD player enters the standby mode.

To Play From Any Desired Selection to the Last Selection of the Disc

6. Designate the desired selection number by the 10 key operation buttons. The red mark (—) of the desired selection (in the display window) lights and play starts.
The desired selection also can be designated by the [AUTO SEARCH (⏮)], [AUTO SEARCH (⏭)] buttons.
In this case, play starts when the [PLAY (▶)] button is pressed.

Example
To start playback from the fourth selection of the disc, press "4" of the 10 key operation buttons.

To Stop Play Temporarily

7. Press the [PAUSE (❚❚)] button. The indicator (❚❚) on the display lights and play stops temporarily.
To continue playing, press the [PLAY (▶)] button.

To Switch Selections During Play

8. • To play from the start of the desired selection, designate the desired selection with the 10 key operation buttons.
• To skip to the next selection during play, press the [AUTO SEARCH (⏭)] button.

Example
To switch from the second selection to the third selection, press the [AUTO SEARCH (⏭)] button.

• To skip to the previous selection, press the [AUTO SEARCH (⏮)] button, and locate the start of the current selection. Immediately after this press the [AUTO SEARCH (⏮)] button again.

Example
To switch during play from the seventh selection to the sixth selection, press the [AUTO SEARCH (⏮)] button twice.

To Repeat Play

9-1. Press the [REPEAT ALL/1] button. The REPEAT ALL indicator light and all the selections or all the programmed selections of the disc can be played back repeatedly. If the [REPEAT ALL/1] button is pressed again, "REPEAT 1" appears in the display window and one display window and one designated selection will be played back repeatedly. To release the repeat play, press the [REPEAT ALL/1] button again.

Note:
• To repeat the programmed play, random play, or play of the first 15 seconds of each selection, press the [REPEAT ALL/1] button.

9-2. **• To establish the starting point of the repeat play**
Press the [REPEAT A ↔ B] button at the point where the start of repeat play is desired (Point A).
"A –" will light in the display window, and the play starting point (Point A) will be stored in memory.

• To establish the ending point of the repeat play
Press the [REPEAT A ↔ B] button again at the point where the end of repeat play is desired (Point B).
(Note: Continue play until such ending point is reached or locate such ending point by pressing the [SEARCH (▶▶)] button.)
"A – B" will light in the display window, and the play ending point (Point B) will be stored in memory. At the same time, play will start from Point A and continue repeatedly between Point A and Point B.

• To eliminate the repeat play between A and B.
Press the [REPEAT A ↔ B] button again, The REPEAT A – B indicator will go off, and the repeat play will be eliminated.
Pressing the [SEARCH (▶▶)] button while the A – B REPEAT indicator is lit causes the memory of Point B to be erased. Therefore, Point B can be renewed by pressing the [SEARCH (▶▶)] button and pressing the [REPEAT A ↔ B] button again.

Note:
• Repeat play between A and B is not possible during programmed play, intro play or random play.

To Cancel Play

10. Press the [STOP (■)] button, and play will stop.

To Remove the Disc

11. Slide the disc platter out by pressing the [OPEN / CLOSE (⏏)] button.

To Program Play

1. Play can be programmed in the standby mode. To program during play, place the CD player in the standby mode by pressing the [STOP (■)] button.
2. Press the [PROGRAM] button. The PROGRAM indicator will light in the display window, thus indicating that the play is ready to be programmed.

TROUBLESHOOTING

3. Program any desired selections by pressing the 10 key and [+10] key operation button. Up to 32 selections, can be programmed. The display shows the total playing time of the programmed selections and the number of memory steps. Each time the programming is finished, the mark " ☐ " beside the programmed selection lights.
4. When the programming is finished, press the [PLAY (▶)] button.
   Play will start in the programmed order.

Note:
- **Even during play, additional programming is possible by pressing the 10 key operation buttons.**

- **Re-programming**

5. Set the CD player to the standby mode and press the [STOP (■)] button.
   By so doing, all the programmed selections are cancelled and programming becomes possible.

- **Release of the programmed status**

6. Press the [PROGRAM] button again. The PROGRAM indicator will go off and the normal (non-programmed) play becomes possible.
   The programmed status can be also released by sliding the disc platter out with the [OPEN / CLOSE (▲)] button.

Notes:
- **If the disc is not rotating during programmed play, the sequence of the programmed selections can be confirmed with the [AUTO SEARCH (⏮)] [AUTO SEARCH (⏭)] buttons.**
- **If the total playing time of the programmed selections exceeds 99 minutes and 59 seconds, only "--:--" will light in the display window.**
- **If the 32nd or higher selection of a disc is programmed, only "--:--" will light in the display window.**

To Play Randomly

1. Press the [RANDOM] button. The "RANDOM" indicator will light, and all the selections will be played once at random. Each time play of an individual selection is finished, its selection number and program chart (☐) go off. When play of all the selections is finished, the CD player goes into the standby mode. However, the random play can be repeated by pressing the [REPEAT ALL/1] button.
2. To release the random play, place the CD player in the standby mode by pressing the [STOP (■)] button or return the random play to the normal play by designating any selection with the 10 key operation buttons.

Note:
- **The programmed selections can not be played at random.**

To Perform the Introduction Play

You can play the first 15 seconds of each selection only through the remote control unit.

To Perform Synchronized Recording and Edit Recording

Synchronized recording is possible by connecting the cassette deck to the COMPU LINK-1/ SYNCHRO terminals of the CD player through the remote wire.

- Press the [REC (○)] and [PAUSE (❚❚)] buttons of the cassette deck.
- Press the [PLAY (▶)] button of the CD Player to start the synchronized recording.

For Edit Recording

1. Place in standby mode.
2. Designate the first selection with the [AUTO SEARCH (⏮, ⏭)] button.
3. Press the EDITING button.
4. While the EDITING indication is lit (about 10 seconds), establish the time interval with the 10-key and [+10] operating button according to the table length.

   Example
   - To establish 30 minutes, press the [+10] button twice and [10] of the 10-key once.
   - To establish 23 minutes, press the [+10] button twice and [3] of the 10-key once.
5. When the time interval is established, the EDITING indicator blinks. Then all the designated and non-designated selections which can be recorded within the time interval are programmed. The program chart selection numbers are displayed in the (☐) mark.
   At this time, in the remaining time interval, if a selection is possible, within that interval after the next selection, that selection number will blink for 10 seconds. By establishing that number in the 10-key, the selection can be recorded within that time interval.
6. Place the cassette deck in the REC PAUSE mode.
7. Press the [PLAY (▶)] button to start recording. When the last program selection recording is completed, the edit recording will automatically stop.

Notes:
- **To change the established time interval, press the [PROGRAM] button once and then press the [EDITING] button again.**

What appears to be a malfunction may not always be serious.
Make sure first ...

Although the disc is inserted in the CD player, "no disc" appears.
Isn't the disc placed upside down?
– Place the disc on the disc tray with its label side up.

Selections can not be programmed.
Is the "PROGRAM" indicator lit?
– Press the [PROGRAM] button.

The sound intermittently and is harsh to the ear.
Is the disc dirty?
– Wipe off the disc surface with a soft cloth.
Is the disc scratch?
– Replace the disc with a new one.
Is the disc warped?
– Replace the disc with the new one.

SPECIFICATIONS

System	: Compact disc player
Signal detection system	: Non-contact optical system
Number of channels	: 2 channels
Frequency response	: 5 Hz – 20,000 Hz
Dynamic range	: 95 dB (1 kHz)
Signal/noise ratio	: 100 dB (at digital 0)
Channel separation	: 90 dB (1 kHz)
Harmonic distortion	: 0.004% (1 kHz)
Wow and flutter	: Less than measurable limit
Output level	: 2.0 Vrms (full scale)
Number of program steps	: 32 steps
Dimensions	**: 435 (W) x 87 (H) x 291 (D) mm (17-3/16" x 3-13/16" x 11-7/16")**
Weight	: 3.8 kg (8.4 lbs)
Accessories	: Signal cord (1 m · 3.28 ft) . . . . 1 Remote cable (1 m · 3.28 ft) 1

Design and specifications subject to change without notice.

POWER SPECIFICATIONS

Areas	Line Voltage & Frequency	Power Consumption
U.S.A.	AC 120 V ∿, 60 Hz	15 watts
Canada		
Continental Europe	AC 220 V ∿, 50 Hz	
U.K.	AC 240 V ∿, 50 Hz	
Australia		
Other areas	AC 110 / 120 / 220 / 240 V ∿ selectable, 50/60 Hz	

Description of Major LSI

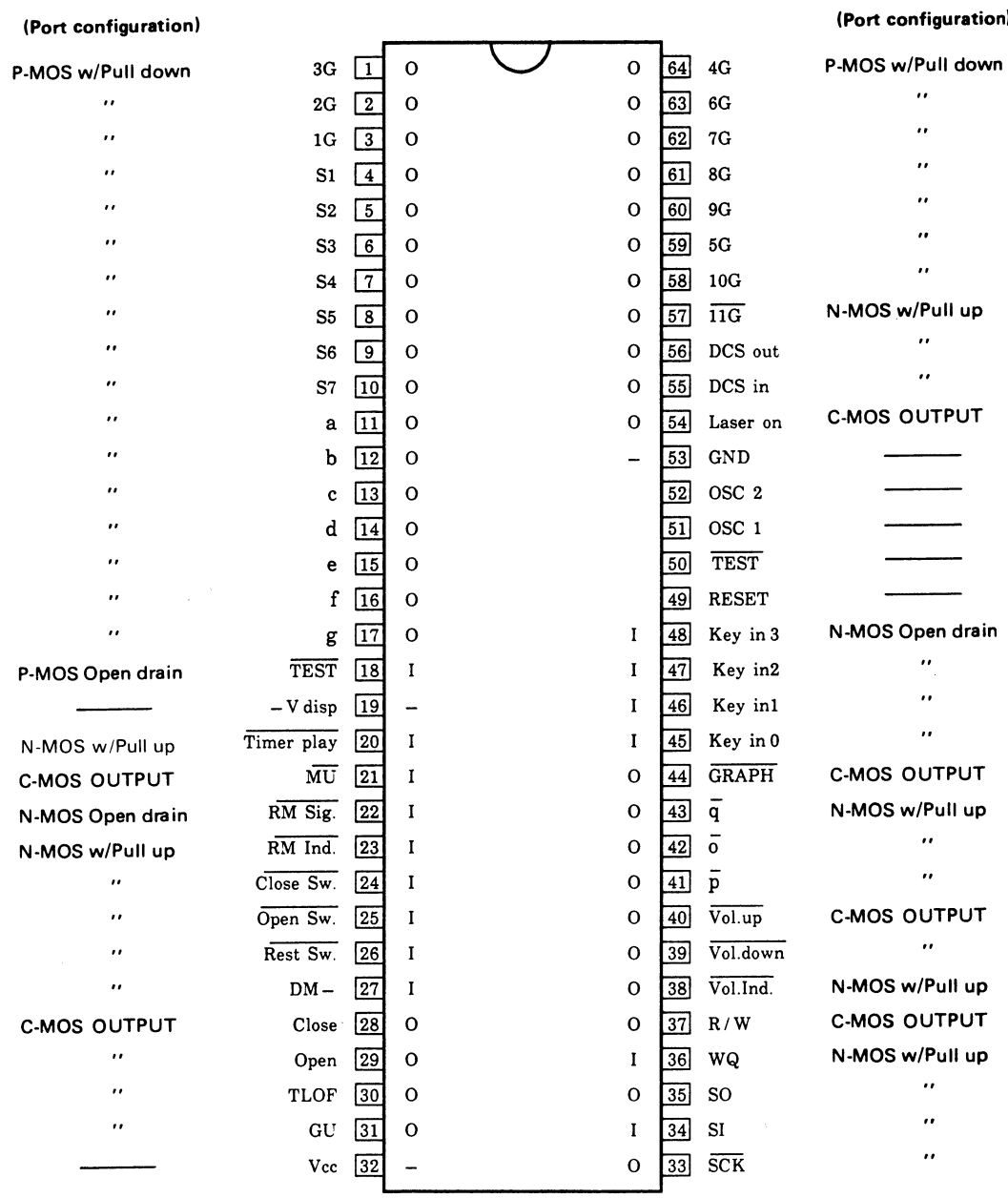
■ IC201: HD614080SC25

(1) Outline:

This LSI is a 4-bit C-MOS single-chip microcomputer. It comprises a 4096 word x 10-bit ROM, and 256 digit x 4-bit RAM, I/O, timer/counter, and a serial interface.

Its major functions include accepting signals from each of the switch groups and outputting operational commands to the LED display and the servo control LSI.

(2) Terminal Layout and Function

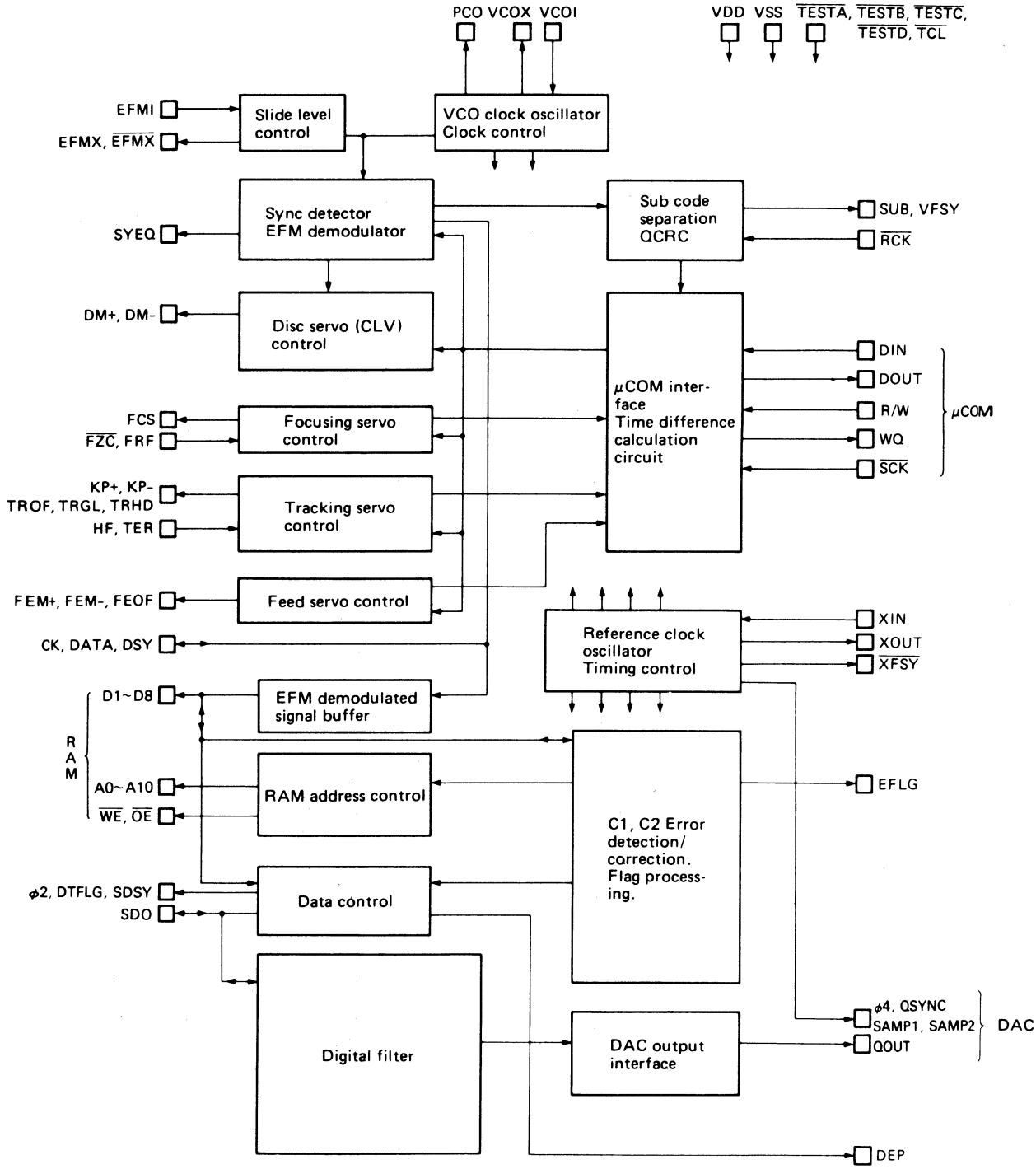


■ IC401: YM3815

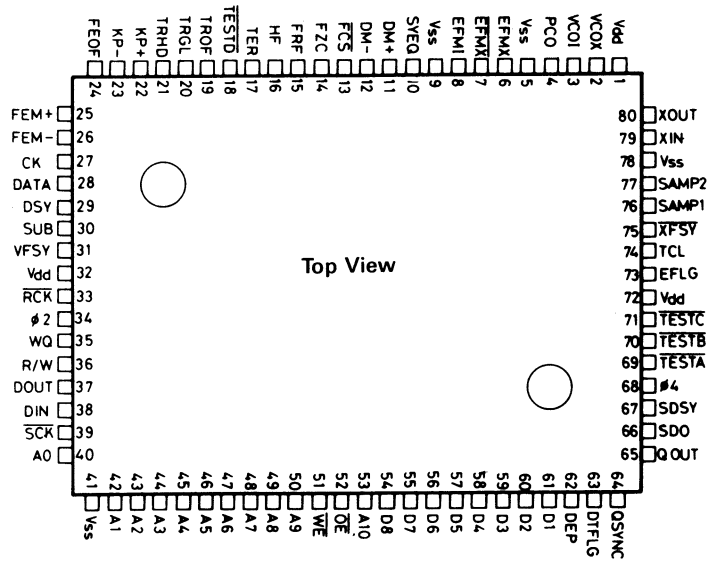
(1) Outline:

YM3815 is a C-MOS LSI for signal processing (SGP) and servo control (SVC) in a CD player. It is used for the demodulation of the EFM signal from the photo pickup, detection/correction of the error signal, signal processing in digital filtering, etc. and for various servo controls (focusing, disc, tracking and feed servos).

(2) Internal block diagram



(3) Terminal Layout



(4) Pin Functions

Pin No.	Pin Name	I/O	Function
1 32 72	VDD	—	These are +5 V power supply terminals.
2 3	VCOX VCOI	O I	A clock pulse (average: 8.6436 MHz) is generated when an LC resonance circuit is connected to these terminals.
4	PCO	O	This terminal outputs the phase difference when the polarity of the clock and the EFM pattern changes; when the polarity becomes positive (+), the polarity of the variable-capacitance diode is set to that the frequency will rise, and clock regeneration is enabled.
5 9 41 78	Vss	—	These are ground terminals.
6 7	EFMX $\overline{EFMX}$	O O	These terminals are connected to the EFM signal slice level control circuit. Amplification-limited, mutually antiphased signals are generated.
8	EFMI	I	The EFM signal (1~2 Vp-p) is input over this terminal.
10	SYEQ	O	This is the check output terminal; it becomes high when the synchronizing signal from the internal counter and the cynchronizing signal detected from the EFM pattern coincide with one another.
11 12	DM+ DM−	O O	These terminals output the PMW for the spindle motor drive circuit. The spindle motor speeds up when DM+ is H, and slows down when DM− is H; both terminals cannot be H simultaneously.
13 14 15	FCS $\overline{FZC}$ FRF	O I+ I	These terminals output signals for controlling the focus servo. The FCS signal activates the focusing (drawing) operation; the $\overline{FZC}$ signal, generated when the focus point is achieved, terminate the focusing operation; and the FCS flag is dropped internally at the FRF signal generated when reflected light is detected.
16 17 19 20 21 22 23	HF TER TROF TRGL TRHD KP+ KP−	I I O O O O O	When tracks are being crossed during searches, the amplitude variation of the generated HF signal is sampled at the zero-cross point of the tracking error signal TER and the TROF signal is output. The level variations of this signal turn the servo on and off, greatly facilitating track acquisition. KP+ or KP− is output to conduct tracking, and TRHD is output during tracking to cause generation of the tracking error signal. The TRGL signal is for increasing the tracking gain after tracking is completed.
24 25 26	FEOF FEM+ FEM−	O O O	The FEM+ and FEM− high-speed feed signals are output over these terminals, as is the FEOF signal for cutting the feed servo. These terminals are all at the low level during normal PLAY operations.

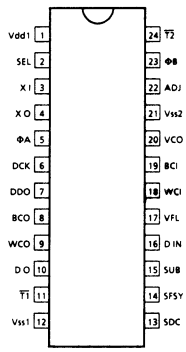
Pin No.	Pin Name	I/O	Function
27	CK	I/O	This is the check terminal. It has a 4.3218-MHz clock, produced by halving the frequency of the VCO.
30 31 33	SUB VFSY $\overline{RCK}$	O O I+	VFSY is an output, synchronizing signal combining the frame and the sub-code frame (frame 98). Sub-codes P~W can be read out in bit serial form from the SUB output terminal if an eight-fold clock is applied to the RCK terminal when the VFSY's level change from H to L can be externally detected.
35	WQ	O	This terminal is connected to COM; it is for inputting the data transfer (SPC to COM) request signal.
36	R/W	I	This terminal is connected to COM; it is the input terminal for changing the data transfer mode: when L, data can be transferred from SPC to COM; when H, from COM to SPC.
37	DOUT	O	This terminal is the data output terminal connected to COM. When R/W is L, data is transferred from SPC to COM in synchronization with the SCK clock input.
38	DIN	I	This terminal is the data input terminal connected to COM. When R/W is H, data is transferred from COM to SPC in synchronization with the SCK clock input.
39	$\overline{SCK}$	I	This terminal is connected to COM; it is an input terminal that carries the clock signal necessary for data transfers.
40 42 ~ 50 53	A0 A1 ~ A9 A10	O	These are address output terminals and are connected to the RAM.
51	$\overline{WE}$	O	This terminal is connected to the RAM; the RAM is set to the write mode when this terminal is L.
52	$\overline{OE}$	O	This terminal is connected to the RAM; the RAM is set to the read mode when this terminal is L.
54 ~ 61	D8 ~ D1	I/O	These are data I/O terminals and are connected to the RAM. They are in the data output state when WE is L, and in the data input state when WE is H.
62	DEP	O	This terminal carriers the frequency characteristic control signal. De-emphasis is necessary when this terminal is H.
34 63 66 67	ϕ2 DTFLG SDO SDSY	O O I/O O	ϕ2 is a 2.1609-MHz crystal clock. SDO is for the serial output signals for the ϕ2 bit rate D/A converter. The L channel has 24 bits and the R channel has 25 bits. They are sent least significant bit first and most significant bit last.
28 29 64 65 68 69 70 71 73 74 75 76 77	DATA DSY QSYNC QOUT ϕ4 $\overline{TESTA}$ $\overline{TESTB}$ $\overline{TESTC}$ EFLG TCL $\overline{XFSY}$ SAMP1 SAMP2	I/O I/O O O O I+ I+ I+ O I+ I/O O O	Not used
79 80	XIN XOUT	I O	Oscillation is conducted when a crystal resonator (8.6436 MHz) is connected between these two terminals, and 10 pF capacitors are connected between each terminal GND.

■ YM3613B (IC709)

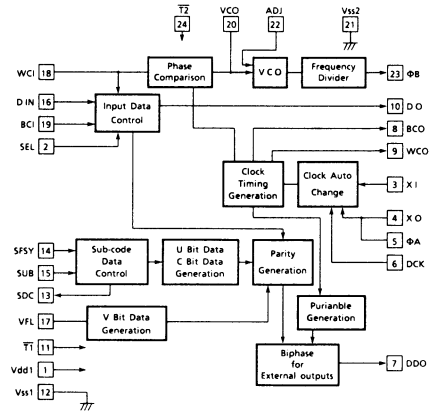
(1) Outline:

The YM3613B is a signal processing LSI for outputting CD player audio digital signals to the outside. This digital signal external output matches EIAJ standards without any special external circuits. A PLL circuit is built in and synchronized with the 44.1-MHz sampling frequency input to this LSI.

(2) External diagram



(3) Internal block diagram



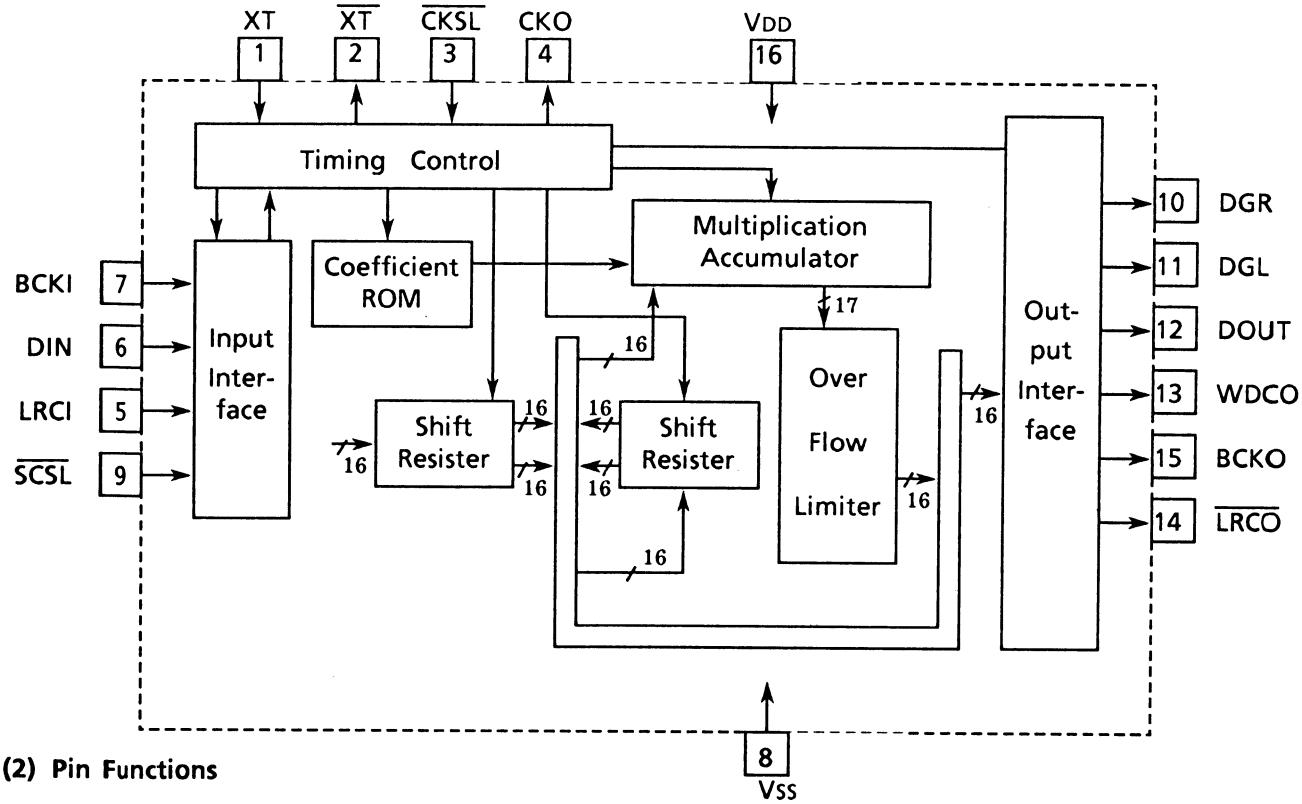
(4) Terminal functions

***The terminals marked with aterisks * are pulled up.**

Pin No.	Pin Name	I/O	Function
1	VDD1		System + 5V power supply
2	SEL	*I	Switches the data input to the DIN terminal between most-significant bit first input and least-significant bit first input. H: most-significant bit first L: least-significant bit first
3	XI	I	Input terminal for 16.93344-MHz crystal oscillator
4	XO	O	Output terminal for crystal oscillator
5	ϕA	O	16.9344-MHz crystal oscillation output terminal
6	DCK	*I	External clock input terminal; automatically switched with the crystal clock (5.6448 MHz).
7	DDO	O	Bi-phase signal output for external digital output
8	BCO	O	Do timing clock; the DO output data is changed at the trailing edge. (2.8224 MHz)
9	WCO	O	This is the signal that shows the L/R channel; synchronized with the DO output. H: L channel L: R channel
10	DO	O	Outputs 16-bit audio data serially from the most significant bit.
11	T1	*I	VCO free run adjustment terminal; usually not connected; low during adjustment
12	VSS1		System ground
13	SDC	O	Timing clock for reading the sub-code data; after SFSY goes low, 8 clock pulses are output.
14	SFSY	I	Indicates the head of the sub-code data at the trailing edge when there is sub-code data at the SUB terminal.
15	SUB	*I	Subcode data input terminal; input serially in the order P-W.
16	DIN	I	16-bit serial data input terminal
17	VFL	I	Indicates the presence or absence of error in the audio data input to the DIN terminal.
18	WCI	I	Signal indicating the L/R channel; synchronized with the audio data input to the DIN terminal. H: L channel L: R channel
19	BCI	I	DIN terminal input audio timing clock The audio data is input at the rising edge when the signal at the SEL terminal is high and input at the trailing edge when the signal at the SEL terminal is low.
20	VCO	I/O	Terminal for an external condenser for the internal VCO circuit
21	VSS2		VCO ground terminal Grounded with VSS1; not connected to VSS1 within the LSI.
22	ADJ	I	VCO oscillation frequency adjustment terminal
23	ϕB	O	VCO output clock (8.6436 MHz)
24	T2	*I	Internal check terminal; not connected.

■ SM5807EP (IC706): 4 times Oversampling Digital Filter

(1) Block Diagram

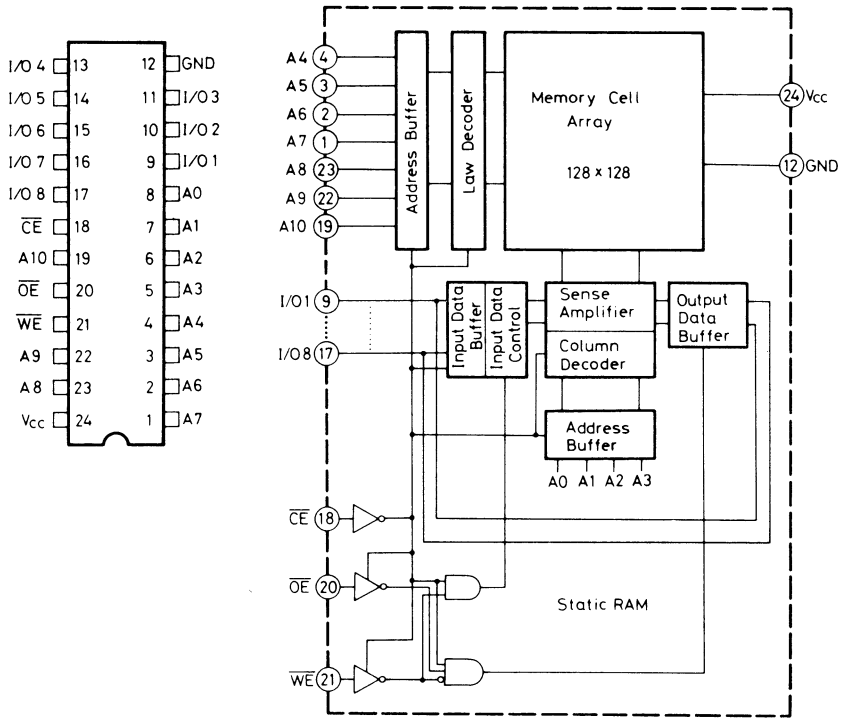


(2) Pin Functions

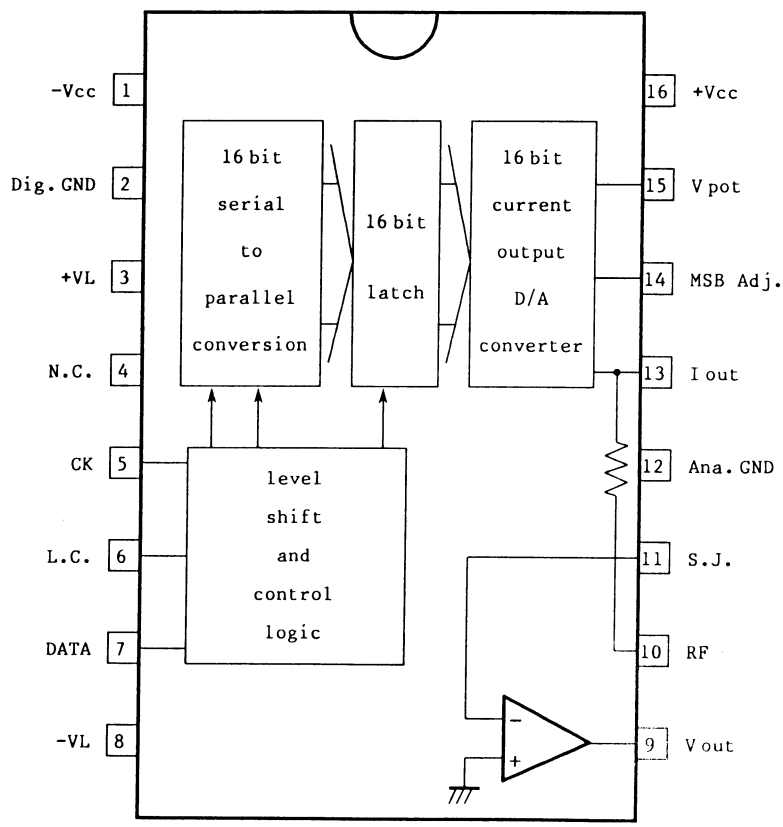
Pin No.	Pin Name	I/O	Function
1	XT	I	Input pin for oscillator .
2	$\overline{XT}$	O	When CKSL is high, output pin for oscillator. When CKSL is low, this pin is open.
3	$\overline{CKSL}$	I(PU)	When CKSL is high, input pin for the crystal oscillator. (16.9344MHz or 17.2872 MHz) When CKSL is low, input pin for the clock. (8.4672MHz or 8.6436MHz)
4	CKO	O	Output pin for the clock frequency.
5	LRCI	I(PU)	Input pin for the synchronizing signal. (44.1KHz)
6	DIN	I(PU)	Input pin for the serial data.
7	BCKI	I(PU)	Input pin for the serial. (Bit clock)
8	VSS		Circuit ground potential.
9	$\overline{SCSL}$	I(PU)	When SCSL is high, system clock is 192fs When SCSL is low, system clock is 196fs.
10	DGR	O	Output pin for the deglitch signal of the right channel.
11	DGL	O	Output pin for the deglitch signal of the left channel.
12	DOUT	O	Output pin for the serial data.
13	WDCO	O	Clock of output control. (352.8KHz)
14	$\overline{LRCO}$	O	Clock of output control. (176.4KHz)
15	BCKO	O	Input pin for the serial. (Bit clock 8.4672MHz or 8.6436MHz)
16	VDD		+5V power supply pin.

Internal Block Diagrams of ICs

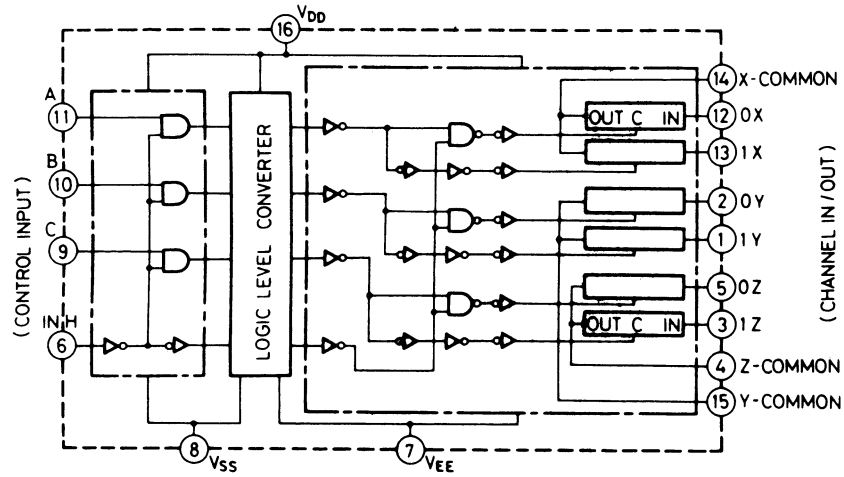
IC402: LC3517BS-15 (Static RAM)



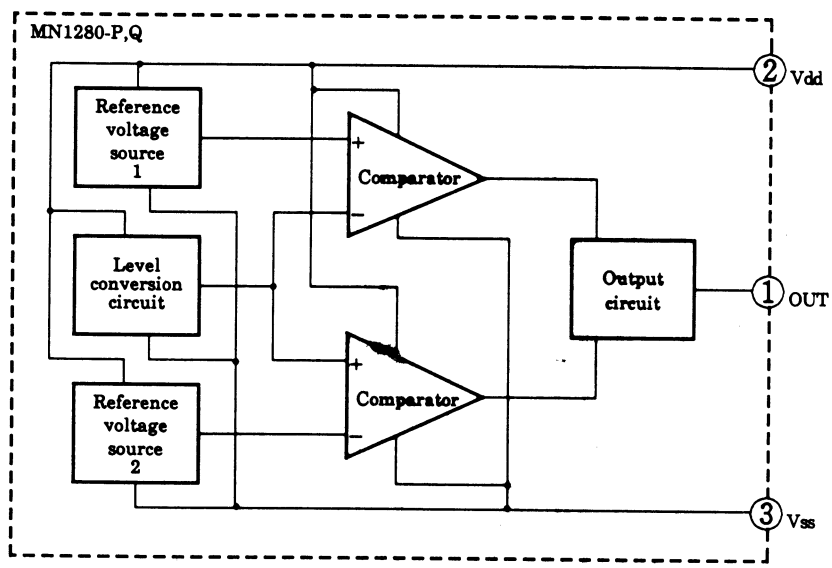
IC705: PCM56P (D/A Converter)



IC703: HD14053BP (Analog SW, Multiplexer)

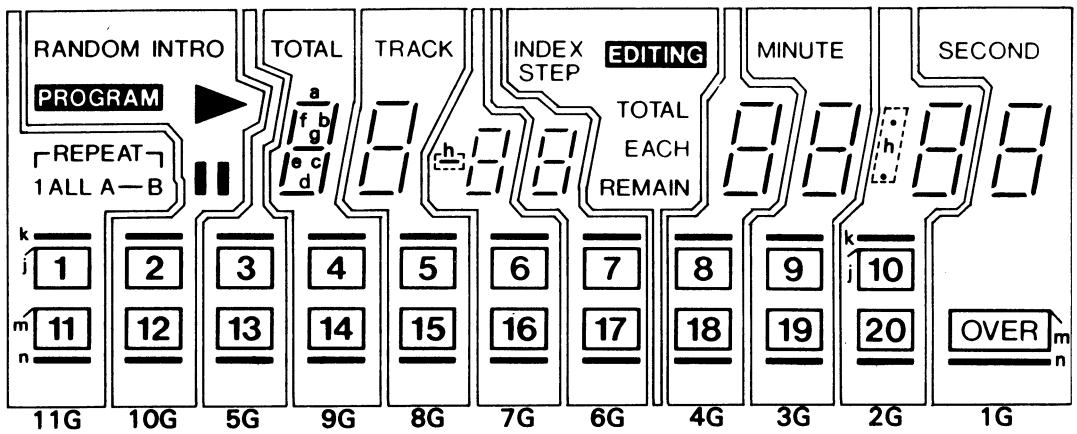


IC202: MN1280 (P, Q)



FL Display Tube Internal Connection

■ Grid Layout



■ Anode Connection

grid (Pin No.) / segment (Pin No.)	11G(4)	10G(7)	9G(12)	8G(15)	7G(17)	6G(20)	5G(9,21)	4G(23)	3G(25)	2G(28)	1G(32)
a(22)	┌REPEAT┐	PROGRAM	a	a	a	a	EDITING	a	a	a	a
b(24)	1	RANDOM	b	b	b	b	TOTAL	b	b	b	b
c(26)	ALL	–	c	c	c	c	EACH	c	c	c	c
d(27)	A–	–	d	d	d	d	REMAIN	d	d	d	d
e(29)	–	INTRO	e	e	e	e	–	e	e	e	e
f(30)	–	–	f	f	f	f	STEP	f	f	f	f
g(31)	–	–	g	g	g	g	–	g	g	g	g
h(19)	B	–	TOTAL	TRACK	h	–	INDEX	–	MINUTE	h	SECOND
i(16)	1	2	4	5	6	7	3	8	9	10	–
j(13)	j	j	j	j	j	j	j	j	j	j	–
k(10)	k	k	k	k	k	k	k	k	k	k	–
l(18)	11	12	14	15	16	17	13	18	19	20	OVER
m(14)	m	m	m	m	m	m	m	m	m	m	m
n(11)	n	n	n	n	n	n	n	n	n	n	n
o(6)	–	▶									
p(5)	–	❚❚									

Disassembly Procedures

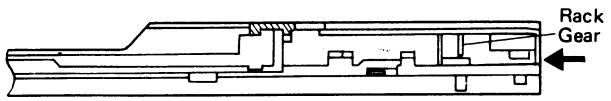
(1) Top cover removal

1. Remove the two screws on each side and the two screws on the rear.
2. Pull the top cover slightly backward and lift it while spreading the back of the left and right sides to remove it.

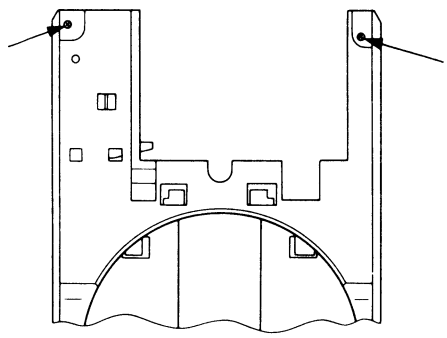
(2) Tray assembly removal

1. Remove the top cover as described in (1).
2. Turn the power on and press the OPEN/CLOSE button to move the tray out. Now turn the power off.

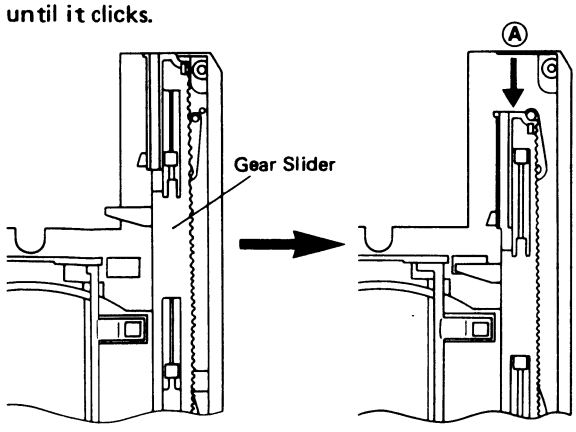
Note: If the power cannot be turned on due to a malfunction, push the rear end of the rack gear toward front forcibly to move out the tray.



3. Remove the tray retaining screws and remove the tray by pulling it forward.



4. When reassembling, if the gear slider is not fully forward, slide it forward (in the direction of the arrow Ⓐ) until it clicks.



(3) Front panel assembly removal

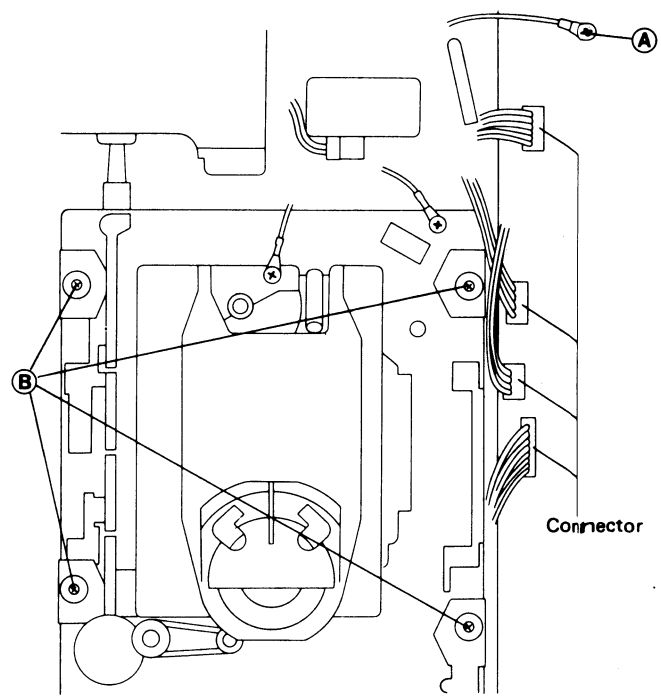
1. Remove the top cover as described in (1), and the tray assembly as described in (2).
2. Remove the plastic rivets on the left and right sides.
3. Now lift so the bottom panel is accessible and remove the three screws from the bottom of the front panel.
4. The front panel can now be detached; release the claws holding the switch PC board to remove completely.

(4) Main PC board removal

1. Remove the front panel assembly as described in (3).
2. Remove the four screws retaining the main printed circuit board; one of these is used to fasten the lug at the end of the ground lead from the mechanism.
3. Remove the two screws securing the output terminals and the COMPU LINK/SYNCHRO terminal on the rear panel.
4. Remove three plastic rivets retaining switch PC board (lower) to the chassis, and remove the switch PC board from the chassis by releasing the catch securing the switch PC board.
5. Lift up the main PC board to remove it.

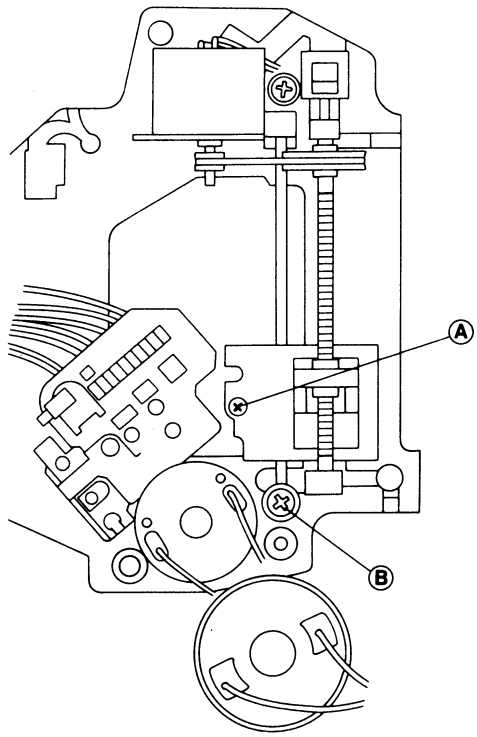
(5) Mechanism assembly removal

1. Remove the top cover as described in (1), and the tray assembly as described in (2).
2. Unplug the two green socket connectors and release the two other connectors from the PCB by lifting their catches with a screwdriver.
3. Unscrew the ground connector from the PCB. (Ⓐ)
4. Remove the four copper-plated screws Ⓑ connecting the mechanism assembly to the chassis and lift the mechanism assembly to remove it.



(6) Laser pickup removal

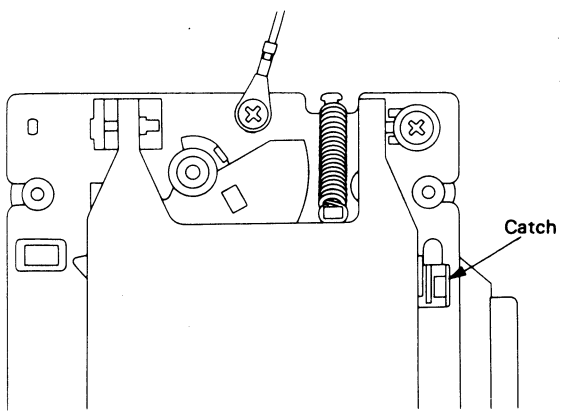
1. Remove the top cover, tray assembly and the mechanism assembly as described above.
2. Turn the mechanism upside down.
3. Remove the screw Ⓐ from the center of the pickup base assembly.
4. Lift the pickup base and slide to remove it.
5. Slide the pickup assembly to the center and remove the washer-head screw Ⓑ retaining the pickup assembly and sliding shaft.



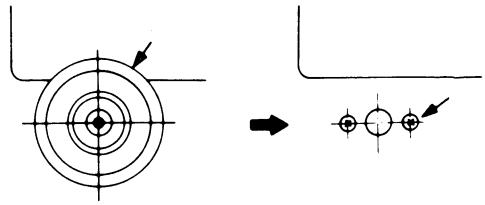
Note:
When disassembling and reassembling, be careful not to get grease on the rubber belt that runs round the pulley.

(7) Spindle motor removal

1. Remove the mechanism assembly as described above.
2. Release the catch holding the disc clamper, and raise the disc clamper straight up (at a right angle).

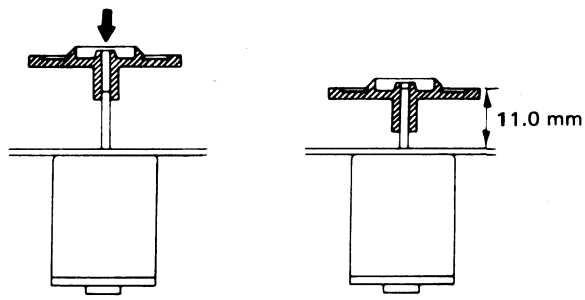


3. Remove the turntable, and remove the two screws retaining the spindle motor.

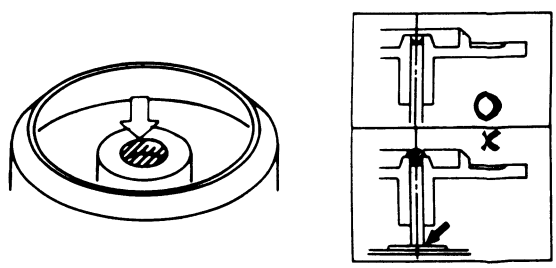


Note: Installation of the spindle motor

1. Secure the two screws, applying uniform tightening torque.
2. Insert the turntable by pressing it.
   The turntable must be inserted straight while supporting the motor at its lowest section; alignment must be accurate to obtain a height of 11.0 mm above the top surface of the mechanism base.



3. After insertion is complete, bond the motor shaft and turntable together (at the section marked by an arrow in the figure on the left below).

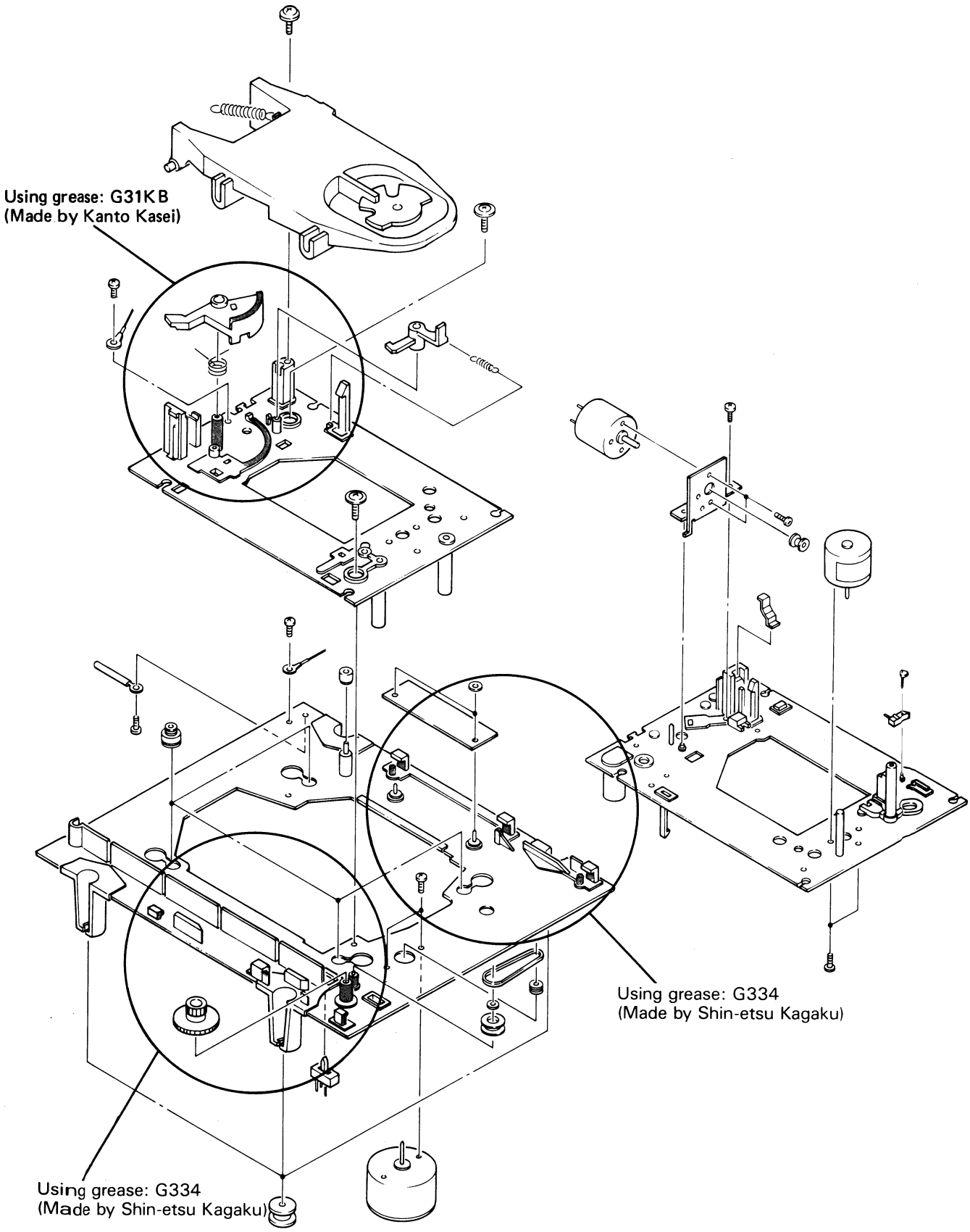


Use "LOCKTITE #460" boanding agent and use as little as possible. Take care not to allow any excess bonding agent to get onto the turntable, as shown in the figure (above). Be extremely careful not to allow bonding agent to adhere to the motor bearings (section marked by an arrow in the figure on the right above).

(8) Notes on removal of main PC board

When removing the main PC board, first remove the front panel.

Application Points for Grease



Maintenance of Laser Pickup

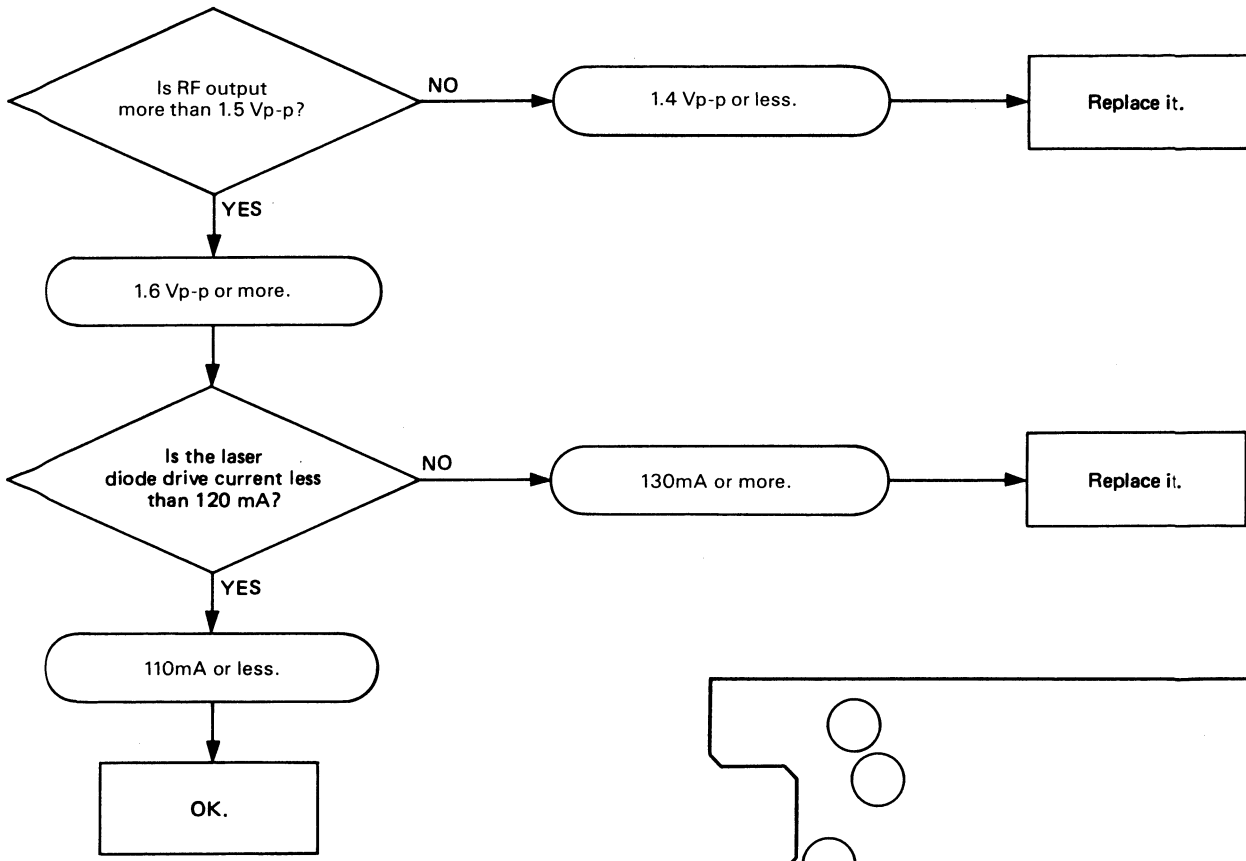
(1) Laser diode life check

When the service life of the laser diode has expired, the following symptoms will appear.

(1) The level of RF output (EFM output: amplitude of eye pattern) will be lowered.

(2) The drive current required by the laser diode will b increased.

In such a case, check the service life of the laser diod following the flowchart below.



(2) Measurement of laser diode drive current

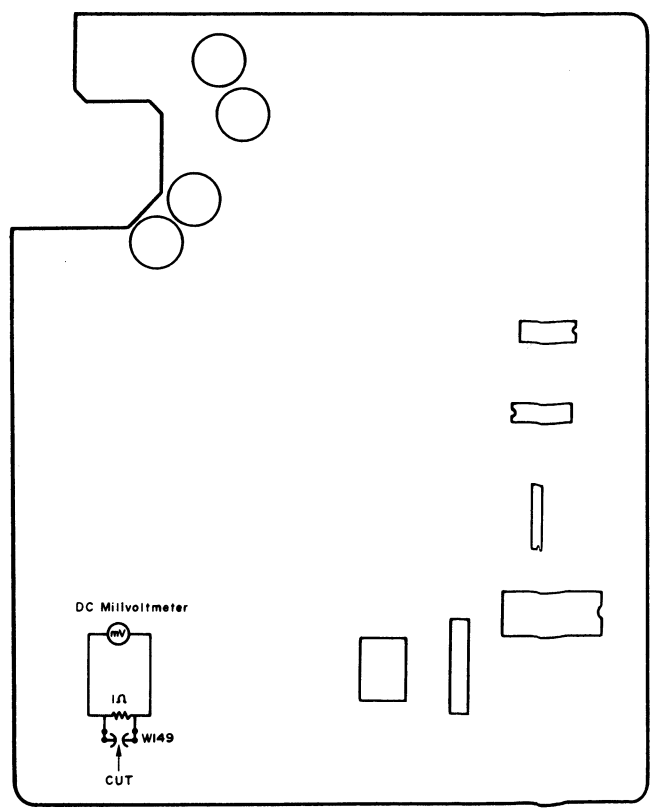
Cut the jumper wire (W149) shown in the figure on the right using pliers, etc., and solder a 1-ohm resistor between the two ends.

Measure the voltage across the resistor with a millivoltmeter. When the voltage is more than 120 mV, it shows that the service life of the laser diode has expired.

(3) Semi-fixed resistor on the APC PC board

The semi-fixed resistor on the APC printed circuit board which is attached to the pickup is used to adjust the laser power. Since this adjustment should be performed to match the characteristics of the whole optical block, do not touch the semi-fixed resistor.

If the laser power is lower than the specified value, the laser diode is almost worn out, and the laser pickup should be replaced. If the semi-fixed resistor is adjusted while the pickup is functioning normally, the laser pickup may be damaged due to excessive current.



Replacement of Laser Pickup

After checking that the POWER switch is turned OFF, disconnect the power cord from the AC outlet.

↓

Replace the pickup with a normal one. (Refer to "Laser Pickup Removal" on the previous page, and the photo on the right.)

↓

Plug in the power cord, and turn the POWER switch ON. At this time, check that the laser is emitted for about 3 seconds and the objective lens moves up and down.
Note: Do not observe the laser beam directly.

↓

Play a disc, and when it starts rotating, short-circuit between TP2 ($\overline{\text{TEST}}$) and TP3 (GND).

↓

Perform tracking gain adjustment.

↓

Remove TP2 ($\overline{\text{TEST}}$) from TP3 (GND).

↓

Check that the eye-pattern waveform is observed at TP4 (RF).

↓

Perform focus offset adjustment.

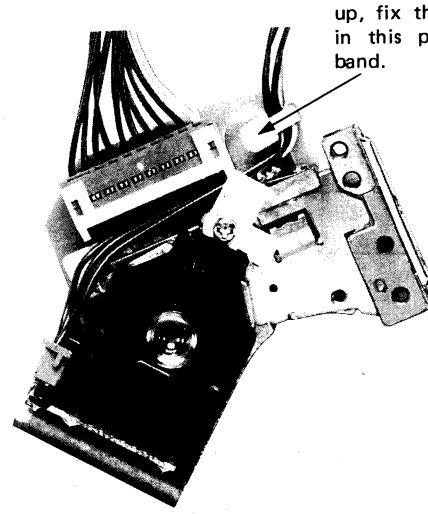
↓

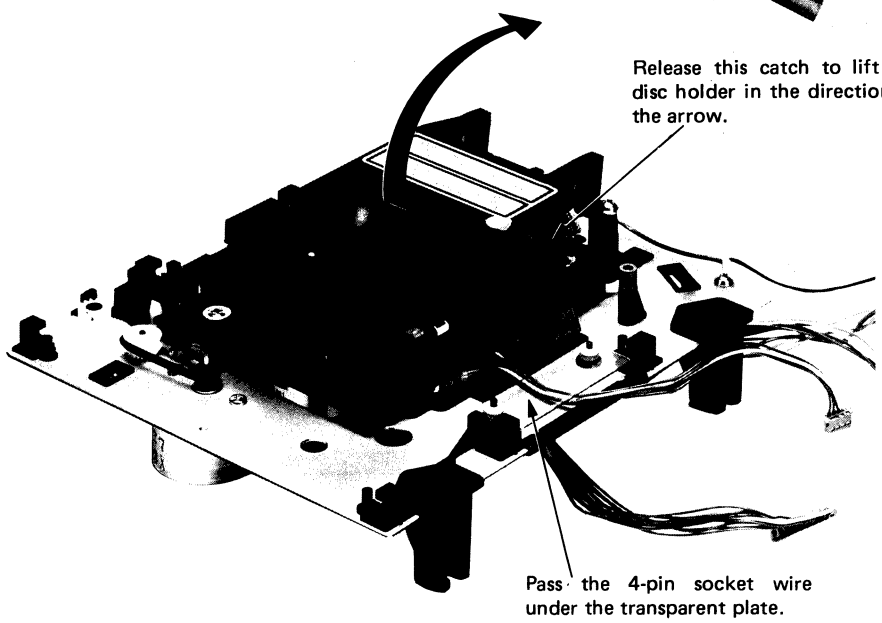
Perform focus gain adjustment.

↓

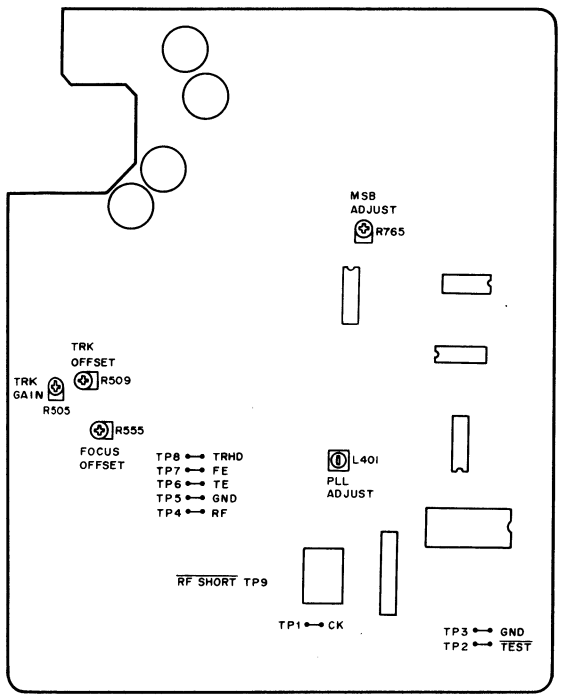
Replacement is now complete.

Note:
Since one adjustment may affect other settings, repeat these adjustments a few times.




Release this catch to lift the disc holder in the direction of the arrow.
Pass the 4-pin socket wire under the transparent plate.

Adjustment Procedures



(1) PLL freerunning adjustment

1) Adjustment instrument
   Frequency counter
2) Adjustment procedure
   1. Connect a frequency counter between TP1 (CK) and TP3 (GND) on the main PC board.
   2. Short TP9 (RF SHORT) and TP5 (GND).
   3. Using the alignment rod, adjust L401 for a frequency counter reading of 4.305 ± 0.005 MHz.
   4. Perform this adjustment immediately after the power is turned on.

(2) Focus offset adjustment

1) Adjustment instruments
   Oscilloscope, Normal disc
2) Adjustment procedure
   1. Connect an oscilloscope between TP4 (RF) and TP5 (GND) on the main PC board.
   2. Play the disc.
   3. Adjust R555 so that the amplitude of the RF signal (waveform on the oscilloscope) becomes maximum with the clearest possible waveform.

(3) Tracking gain adjustment

1) Adjustment instruments
   Oscilloscope, Normal disc
2) Adjustment procedure
   1. Connect an oscilloscope between TP6 (TE) and TP5 (GND) on the main PC board.
   2. Play the disc.
   3. Short TP2 ($\overline{\text{TEST}}$) to TP3 (GND).
   4. Adjust R505 so that the tracking error signal (waveform on the oscilloscope) is 1.8 Vp-p.

(4) Tracking offset adjustment

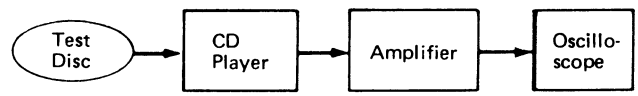
1) Adjustment instruments
   Oscilloscope, Normal disc
2) Adjustment procedure
   1. Connect an oscilloscope between TP6 (TE) and TP5 (GND) on the main PC board.
   2. Play the disc.
   3. Short TP2 ($\overline{\text{TEST}}$) to TP3 (GND).
   4. Adjust R509 so that the DC level of the tracking error signal (waveform on the oscilloscope) becomes 0.

   Note: Adjust R509 so that the waveform becomes symmetrical around the 0 level.

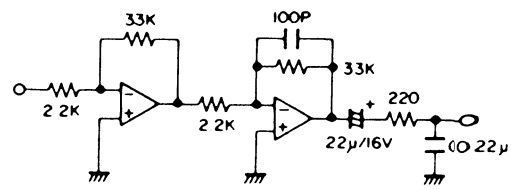
(5) Zero-Cross Distortion Adjustment (MSB*)

1) Adjustment instrument
   Oscilloscope, Test disc (CRG1106), Amplifier (amplification of approx. 47 dB)
2) Adjustment procedure
   1. Connect an amplifier and an oscilloscope to the output of the player.
   2. Turn the POWER switch ON.
   3. Load the test disc and play track 9 (1 kHz, -60 dB).
   4. Adjust R765 (MSB) so that the correct sine wave as shown in the figure is obtained.

   *MSB: Most Significant Bit



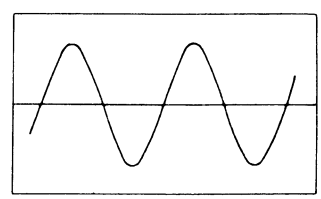
* The amplifier can be replaced with a level meter, etc.



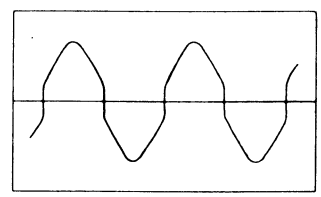
Recommended amplifier circuit (approx. 47 dB)

* Use NJM4560DX or M5220 for op amp.

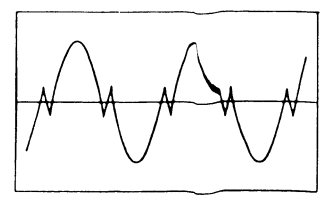
Zero-cross distortion waveform



OK

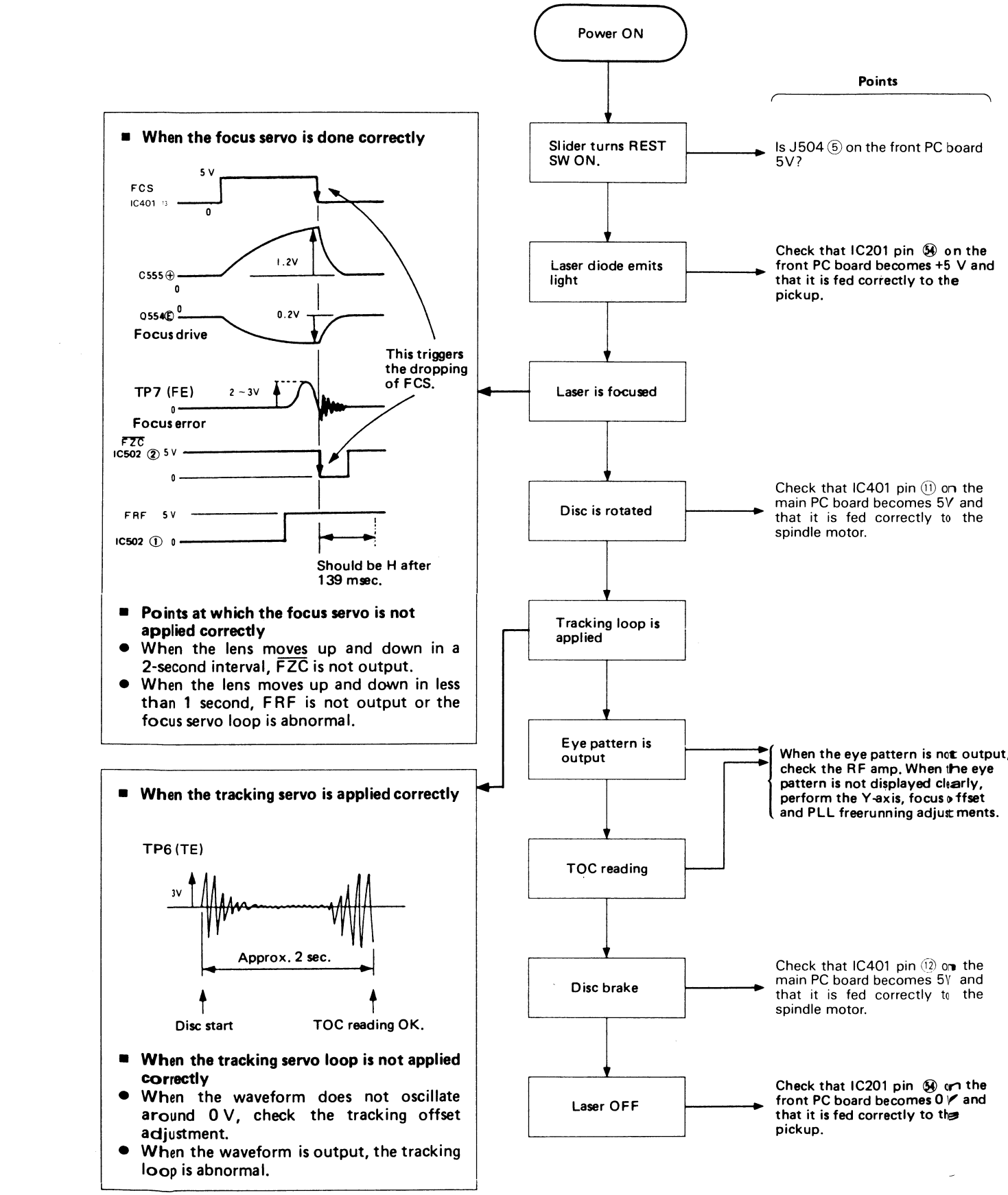


Unacceptable



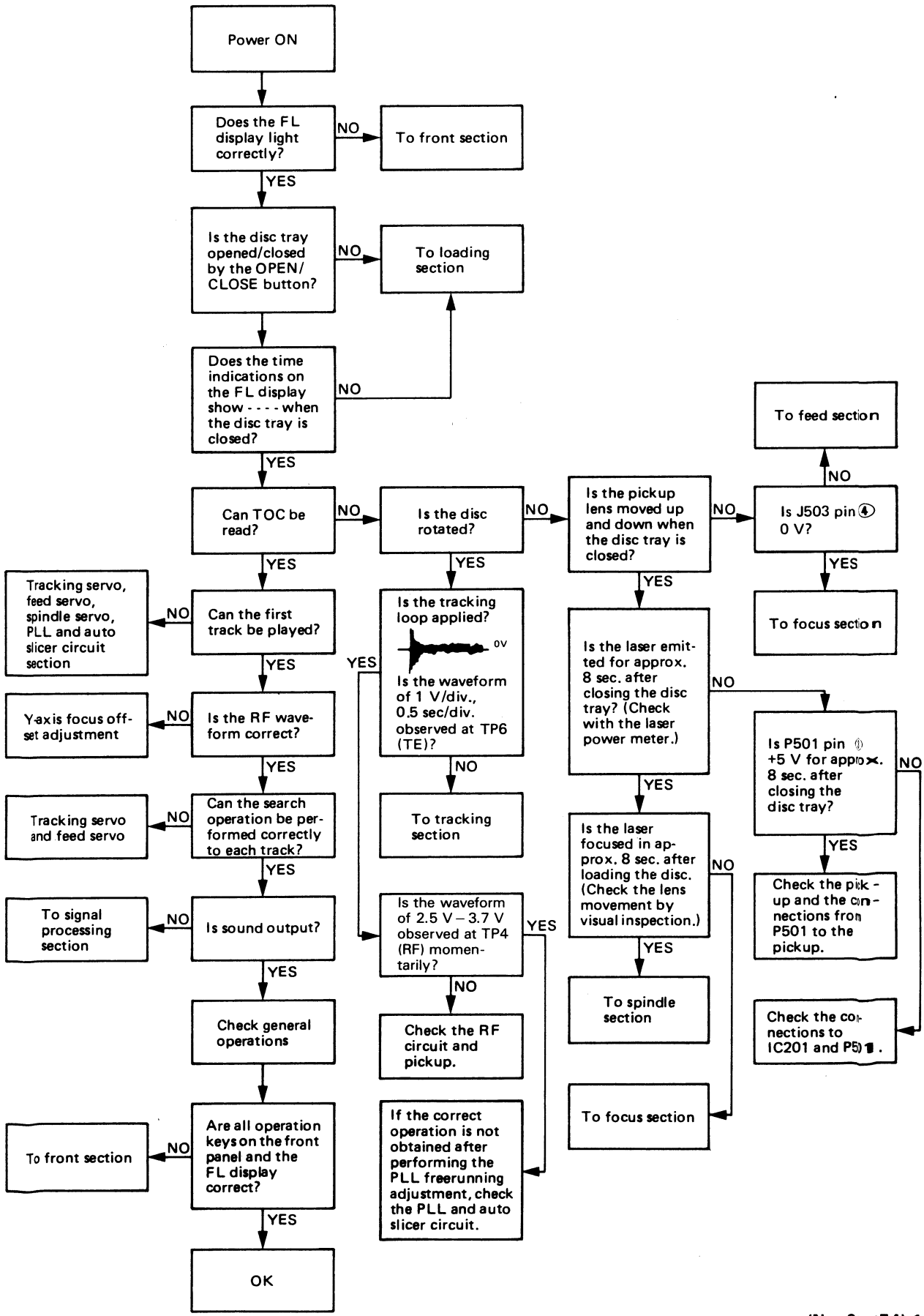
Unacceptable

Flow of Operation Until TOC is Read

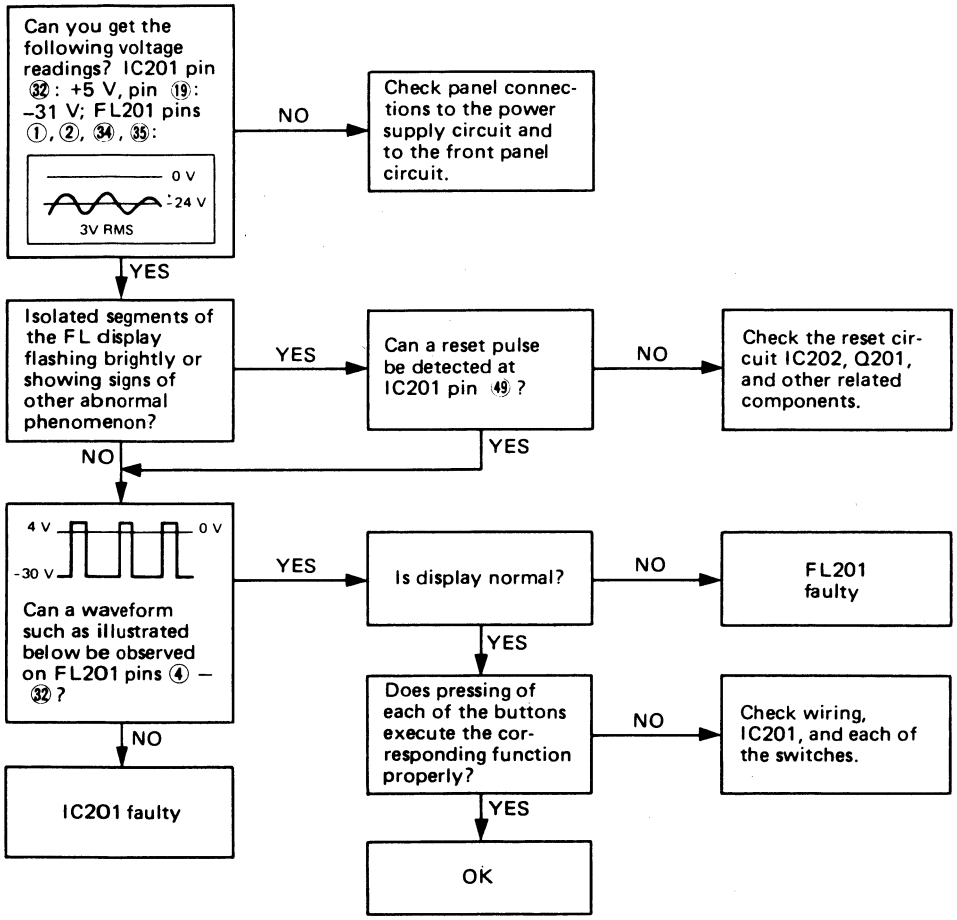

Power ON
Points
Slider turns REST SW ON.
Is J504 ⑤ on the front PC board 5V?
Laser diode emits light
Check that IC201 pin ㊹ on the front PC board becomes +5 V and that it is fed correctly to the pickup.
Laser is focused
Disc is rotated
Check that IC401 pin ⑪ on the main PC board becomes 5V and that it is fed correctly to the spindle motor.
Tracking loop is applied
Eye pattern is output
When the eye pattern is not output, check the RF amp. When the eye pattern is not displayed clearly, perform the Y-axis, focus offset and PLL freerunning adjustments.
TOC reading
Disc brake
Check that IC401 pin ⑫ on the main PC board becomes 5V and that it is fed correctly to the spindle motor.
Laser OFF
Check that IC201 pin ㊹ on the front PC board becomes 0 V and that it is fed correctly to the pickup.
■ When the focus servo is done correctly
5 V
FCS
IC401 13
0
1.2V
C555⊕
0
0554⊖ 0
0.2V
Focus drive
This triggers the dropping of FCS.
TP7 (FE)
2 ~ 3V
0
Focus error
FZC
IC502 ② 5 V
0
FRF 5 V
IC502 ① 0
Should be H after 139 msec.
■ Points at which the focus servo is not applied correctly
● When the lens moves up and down in a 2-second interval, FZC is not output.
● When the lens moves up and down in less than 1 second, FRF is not output or the focus servo loop is abnormal.
■ When the tracking servo is applied correctly
TP6 (TE)
3V
Approx. 2 sec.
Disc start
TOC reading OK.
■ When the tracking servo loop is not applied correctly
● When the waveform does not oscillate around 0 V, check the tracking offset adjustment.
● When the waveform is output, the tracking loop is abnormal.

Troubleshooting

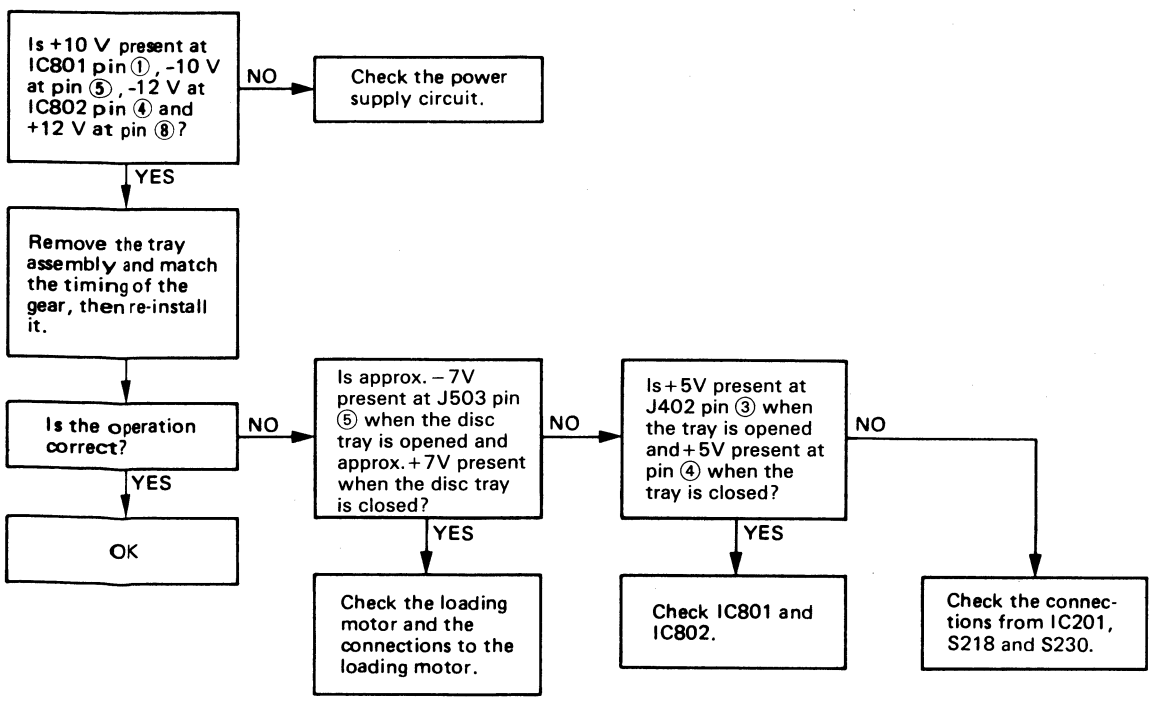
Shows the condition of each circuit from the time when the power is turned on to when play can be started.


Power ON
Does the FL display light correctly?
NO
To front section
YES
Is the disc tray opened/closed by the OPEN/ CLOSE button?
NO
To loading section
Does the time indications on the FL display show - - - - when the disc tray is closed?
NO
YES
Can TOC be read?
NO
Is the disc rotated?
NO
Is the pickup lens moved up and down when the disc tray is closed?
NO
Is J503 pin ④ 0 V?
NO
To feed section
YES
To focus section
YES
YES
YES
Tracking servo, feed servo, spindle servo, PLL and auto slicer circuit section
NO
Can the first track be played?
YES
Is the tracking loop applied?
0V
YES
Is the waveform of 1 V/div., 0.5 sec/div. observed at TP6 (TE)?
Is the laser emitted for approx. 8 sec. after closing the disc tray? (Check with the laser power meter.)
NO
Is P501 pin ① +5 V for approx. 8 sec. after closing the disc tray?
NO
Y-axis focus offset adjustment
NO
Is the RF waveform correct?
YES
NO
To tracking section
YES
YES
YES
Tracking servo and feed servo
NO
Can the search operation be performed correctly to each track?
YES
Is the laser focused in approx. 8 sec. after loading the disc. (Check the lens movement by visual inspection.)
NO
Check the pick-up and the connections from P501 to the pickup.
YES
To signal processing section
NO
Is sound output?
YES
Is the waveform of 2.5 V – 3.7 V observed at TP4 (RF) momentarily?
YES
NO
YES
To spindle section
Check the connections to IC201 and P501.
Check general operations
Check the RF circuit and pickup.
To front section
NO
Are all operation keys on the front panel and the FL display correct?
If the correct operation is not obtained after performing the PLL freerunning adjustment, check the PLL and auto slicer circuit.
To focus section
YES
OK

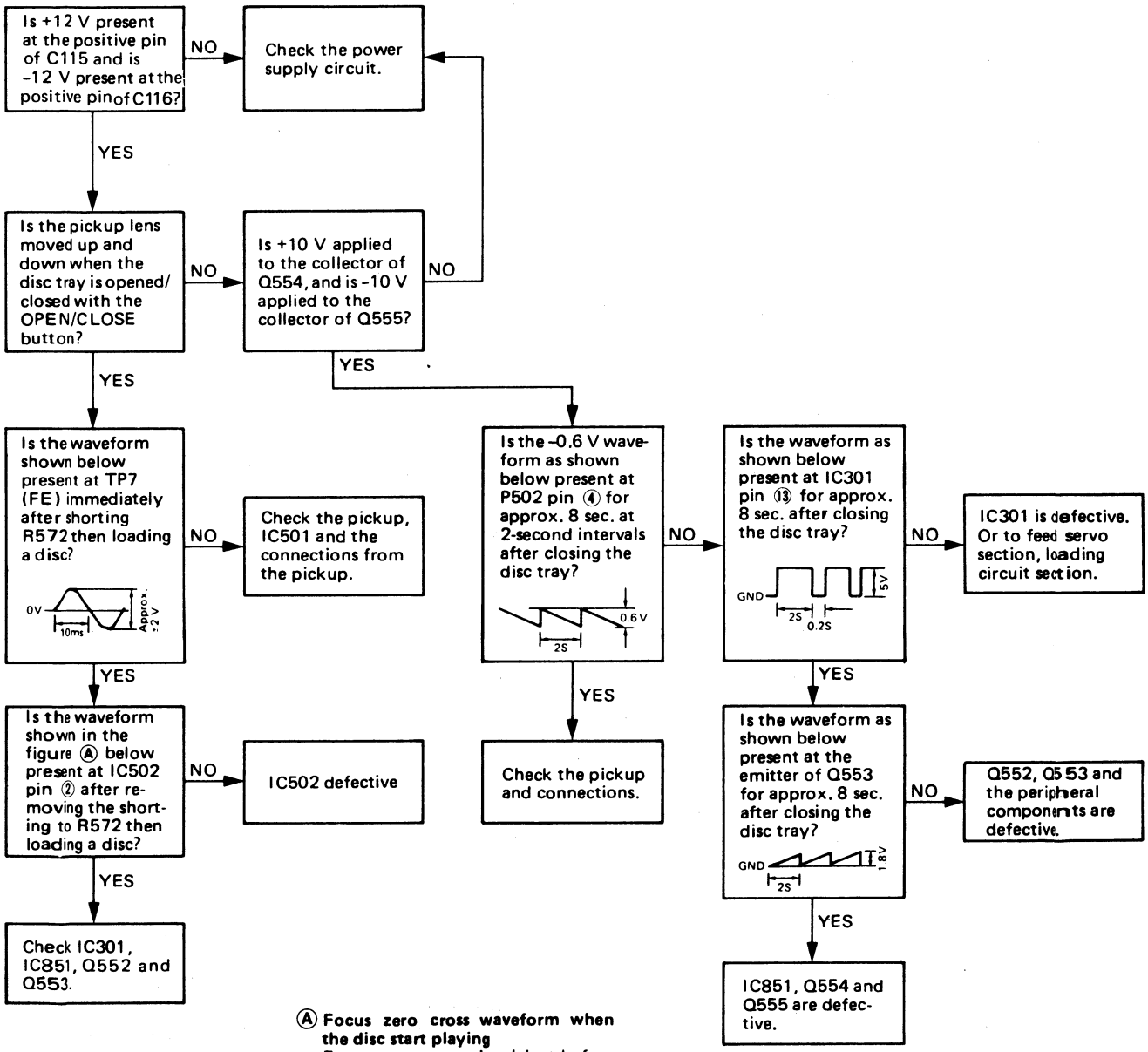
Front circuit section


Can you get the following voltage readings? IC201 pin ㉜: +5 V, pin ⑲: -31 V; FL201 pins ①, ②, ㉞, ㉟:
0 V
24 V
3V RMS
NO
Check panel connections to the power supply circuit and to the front panel circuit.
YES
Isolated segments of the FL display flashing brightly or showing signs of other abnormal phenomenon?
YES
Can a reset pulse be detected at IC201 pin ㊾ ?
NO
Check the reset circuit IC202, Q201, and other related components.
YES
NO
4 V
0 V
-30 V
Can a waveform such as illustrated below be observed on FL201 pins ④ – ㉜ ?
YES
Is display normal?
NO
FL201 faulty
YES
Does pressing of each of the buttons execute the corresponding function properly?
NO
Check wiring, IC201, and each of the switches.
YES
OK
NO
IC201 faulty

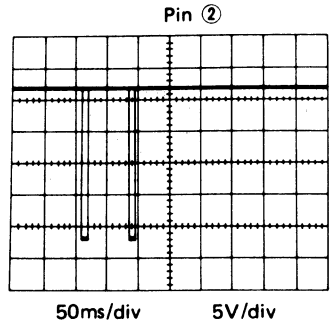
Loading circuit section


Is +10 V present at IC801 pin ①, -10 V at pin ⑤, -12 V at IC802 pin ④ and +12 V at pin ⑧?
NO
Check the power supply circuit.
YES
Remove the tray assembly and match the timing of the gear, then re-install it.
Is the operation correct?
NO
Is approx. – 7V present at J503 pin ⑤ when the disc tray is opened and approx. + 7V present when the disc tray is closed?
NO
Is + 5V present at J402 pin ③ when the tray is opened and + 5V present at pin ④ when the tray is closed?
NO
YES
OK
YES
Check the loading motor and the connections to the loading motor.
YES
Check IC801 and IC802.
Check the connections from IC201, S218 and S230.

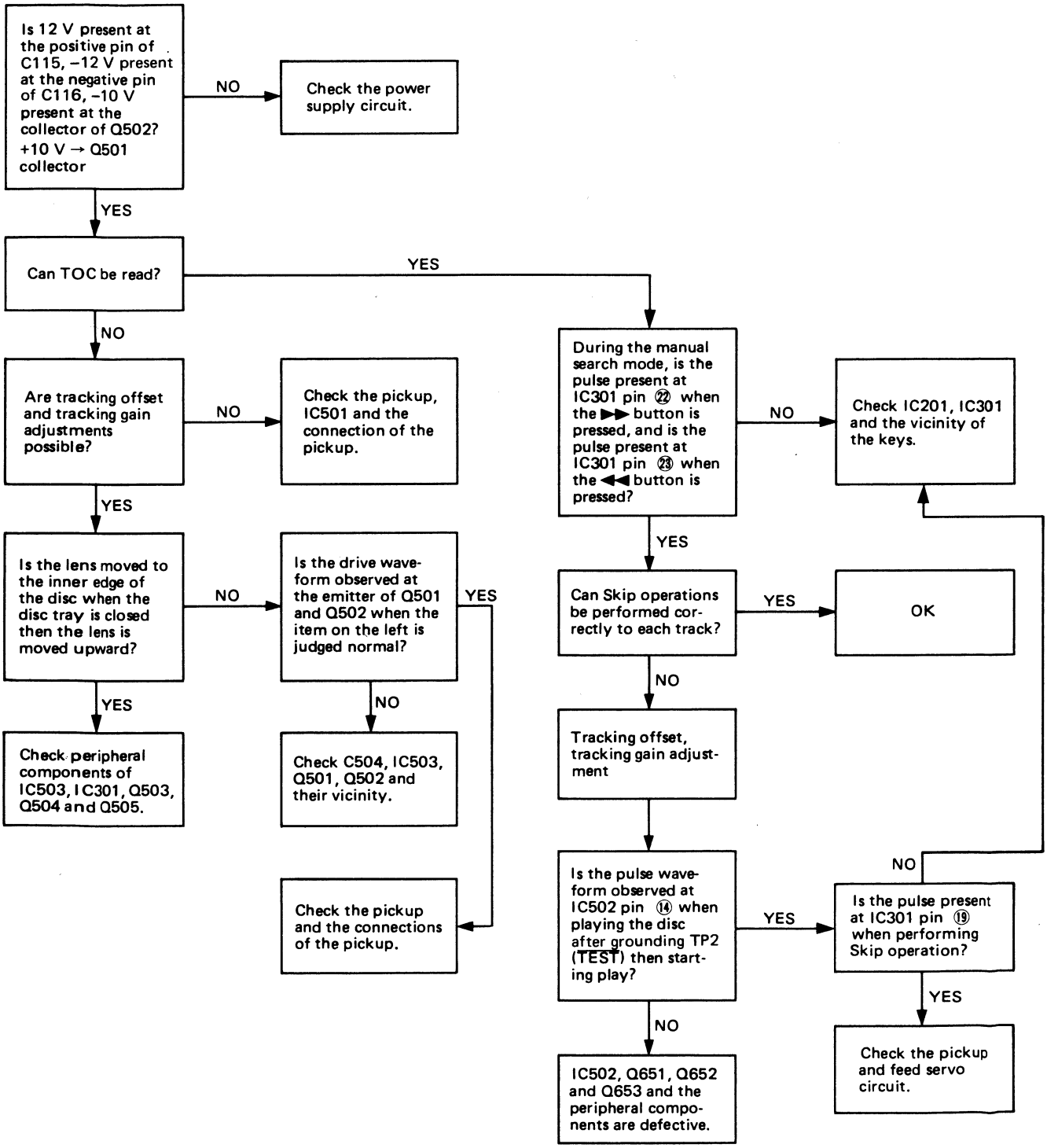
Focus servo circuit section


Is +12 V present at the positive pin of C115 and is -12 V present at the positive pin of C116?
NO
Check the power supply circuit.
YES
Is the pickup lens moved up and down when the disc tray is opened/closed with the OPEN/CLOSE button?
NO
Is +10 V applied to the collector of Q554, and is -10 V applied to the collector of Q555?
NO
YES
YES
Is the waveform shown below present at TP7 (FE) immediately after shorting R572 then loading a disc?
0V
Approx. ±2 V
10ms
NO
Check the pickup, IC501 and the connections from the pickup.
YES
Is the waveform shown in the figure Ⓐ below present at IC502 pin ② after removing the shorting to R572 then loading a disc?
NO
IC502 defective
YES
Check IC301, IC851, Q552 and Q553.
Is the -0.6 V waveform as shown below present at P502 pin ④ for approx. 8 sec. at 2-second intervals after closing the disc tray?
0.6 V
2S
NO
YES
Check the pickup and connections.
Is the waveform as shown below present at IC301 pin ⑬ for approx. 8 sec. after closing the disc tray?
GND
5V
2S
0.2S
NO
IC301 is defective. Or to feed servo section, loading circuit section.
YES
Is the waveform as shown below present at the emitter of Q553 for approx. 8 sec. after closing the disc tray?
GND
1.8V
2S
NO
Q552, Q553 and the peripheral components are defective.
YES
IC851, Q554 and Q555 are defective.

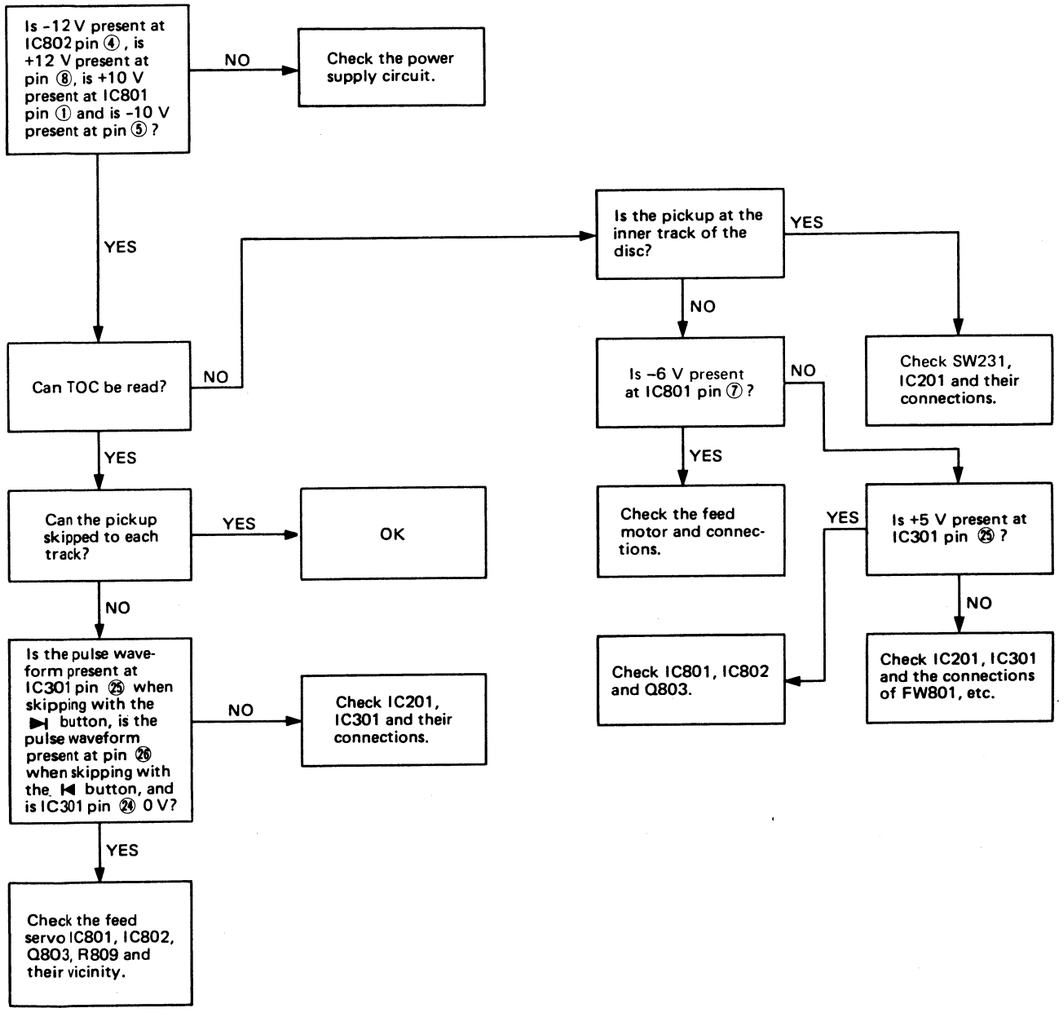
Ⓐ **Focus zero cross waveform when the disc start playing**
Focus zero cross signal just before starting play: the width of the pulse is approx. 10 msec.



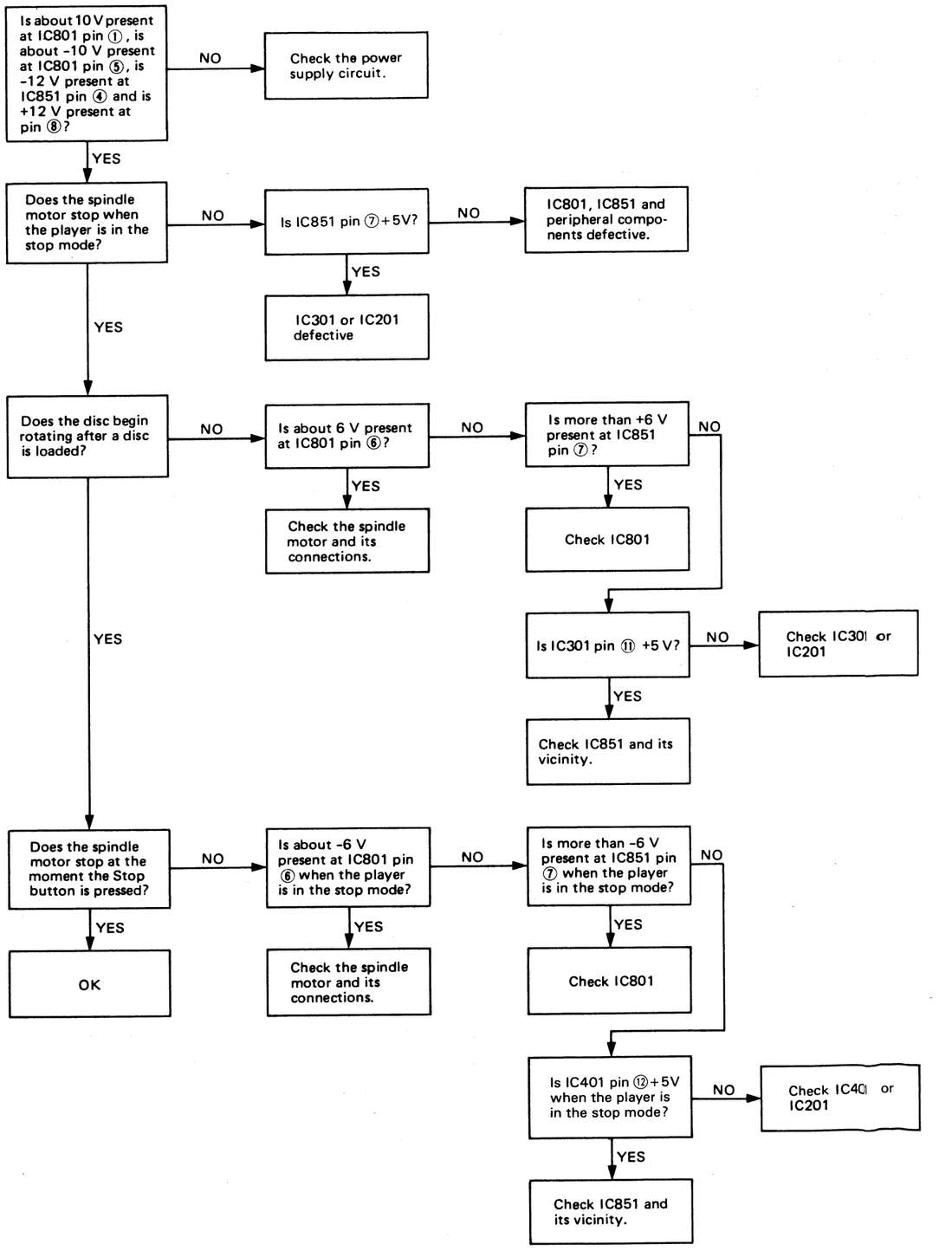
Tracking servo circuit section


Is 12 V present at the positive pin of C115, −12 V present at the negative pin of C116, −10 V present at the collector of Q502? +10 V → Q501 collector
NO
Check the power supply circuit.
YES
Can TOC be read?
YES
NO
Are tracking offset and tracking gain adjustments possible?
NO
Check the pickup, IC501 and the connection of the pickup.
YES
Is the lens moved to the inner edge of the disc when the disc tray is closed then the lens is moved upward?
NO
Is the drive waveform observed at the emitter of Q501 and Q502 when the item on the left is judged normal?
YES
YES
Check peripheral components of IC503, IC301, Q503, Q504 and Q505.
NO
Check C504, IC503, Q501, Q502 and their vicinity.
Check the pickup and the connections of the pickup.
During the manual search mode, is the pulse present at IC301 pin ㉒ when the ▶▶ button is pressed, and is the pulse present at IC301 pin ㉓ when the ◀◀ button is pressed?
NO
Check IC201, IC301 and the vicinity of the keys.
YES
Can Skip operations be performed correctly to each track?
YES
OK
NO
Tracking offset, tracking gain adjustment
Is the pulse waveform observed at IC502 pin ⑭ when playing the disc after grounding TP2 (TEST) then starting play?
YES
NO
Is the pulse present at IC301 pin ⑲ when performing Skip operation?
NO
YES
Check the pickup and feed servo circuit.
NO
IC502, Q651, Q652 and Q653 and the peripheral components are defective.

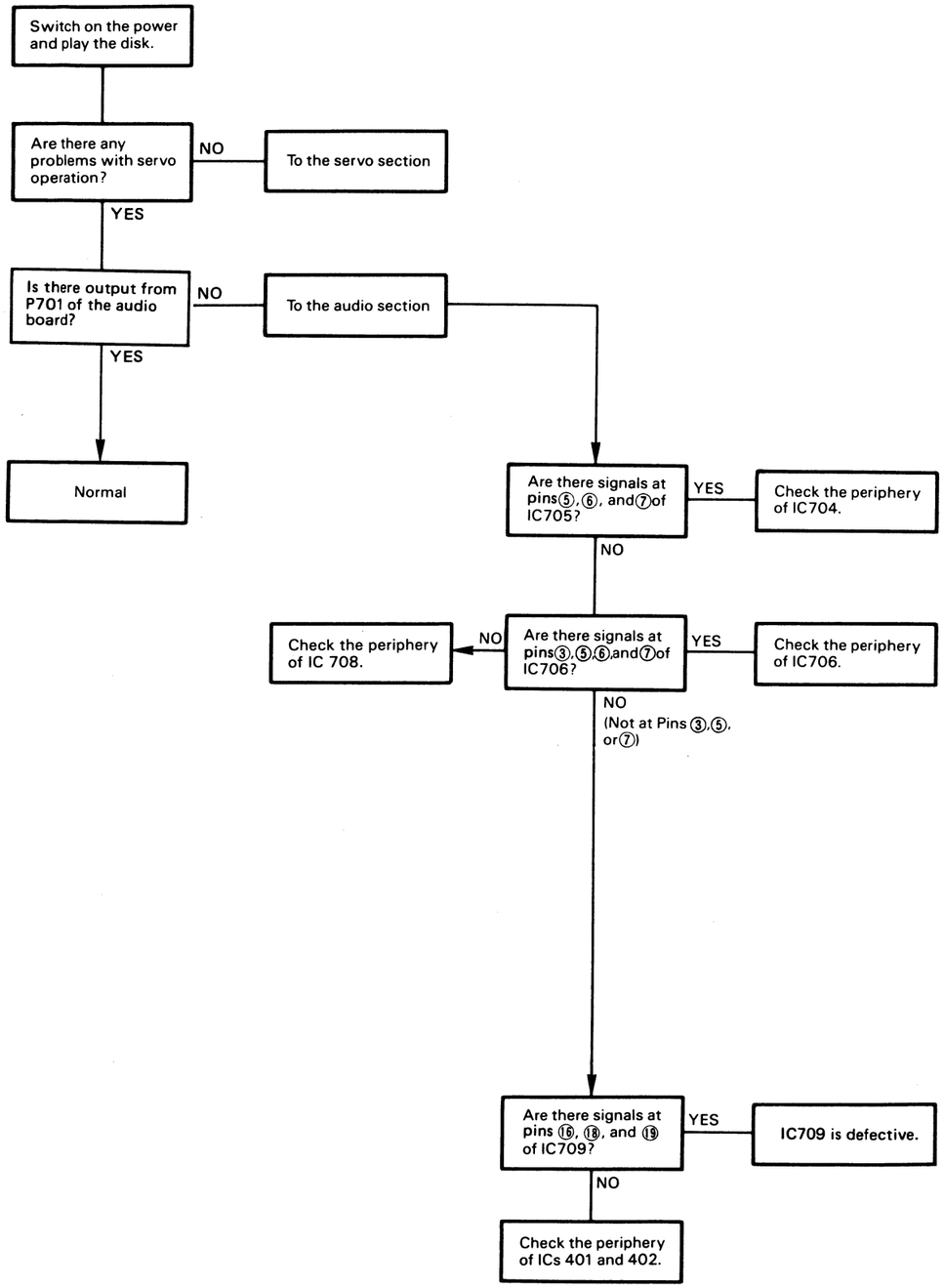
Feed servo circuit section


Is -12 V present at IC802 pin ④, is +12 V present at pin ⑧, is +10 V present at IC801 pin ① and is -10 V present at pin ⑤?
NO
Check the power supply circuit.
YES
Can TOC be read?
NO
Is the pickup at the inner track of the disc?
YES
NO
Check SW231, IC201 and their connections.
Is -6 V present at IC801 pin ⑦?
NO
YES
Check the feed motor and connections.
YES
Is +5 V present at IC301 pin ㉓?
NO
Check IC201, IC301 and the connections of FW801, etc.
Check IC801, IC802 and Q803.
YES
Can the pickup skipped to each track?
YES
OK
NO
Is the pulse waveform present at IC301 pin ㉕ when skipping with the ▶| button, is the pulse waveform present at pin ㉖ when skipping with the |◀ button, and is IC301 pin ㉔ 0 V?
NO
Check IC201, IC301 and their connections.
YES
Check the feed servo IC801, IC802, Q803, R809 and their vicinity.

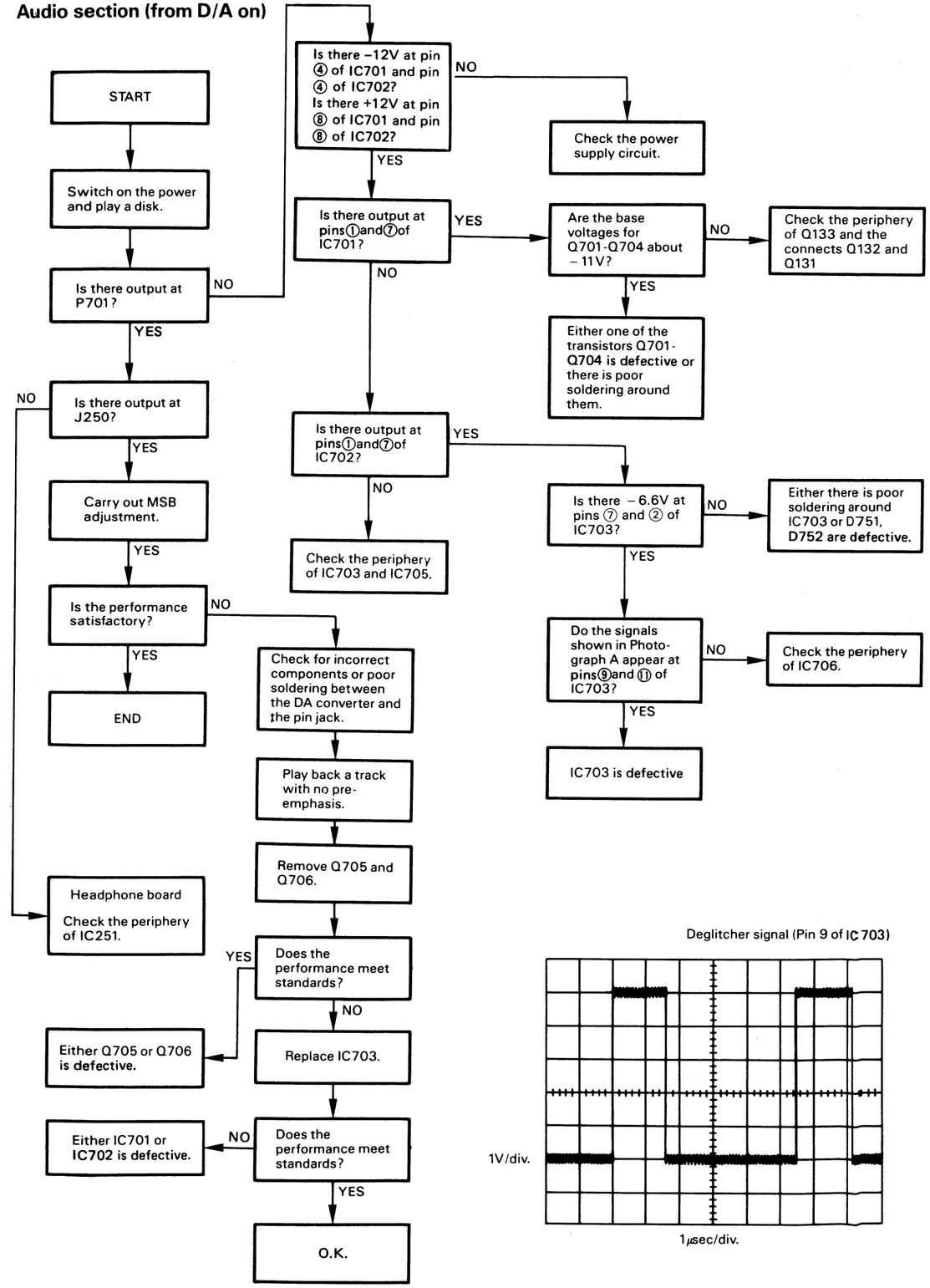
Spindle servo circuit section


Is about 10 V present at IC801 pin ①, is about -10 V present at IC801 pin ⑤, is -12 V present at IC851 pin ④ and is +12 V present at pin ⑧?
NO
Check the power supply circuit.
YES
Does the spindle motor stop when the player is in the stop mode?
NO
Is IC851 pin ⑦ +5V?
NO
IC801, IC851 and peripheral components defective.
YES
IC301 or IC201 defective
YES
Does the disc begin rotating after a disc is loaded?
NO
Is about 6 V present at IC801 pin ⑥?
NO
Is more than +6 V present at IC851 pin ⑦?
NO
YES
Check the spindle motor and its connections.
YES
Check IC801
YES
Is IC301 pin ⑪ +5 V?
NO
Check IC301 or IC201
YES
Check IC851 and its vicinity.
YES
Does the spindle motor stop at the moment the Stop button is pressed?
NO
Is about -6 V present at IC801 pin ⑥ when the player is in the stop mode?
NO
Is more than -6 V present at IC851 pin ⑦ when the player is in the stop mode?
NO
YES
OK
YES
Check the spindle motor and its connections.
YES
Check IC801
Is IC401 pin ⑫ +5V when the player is in the stop mode?
NO
Check IC401 or IC201
YES
Check IC851 and its vicinity.

Signal processing section (digital filter)

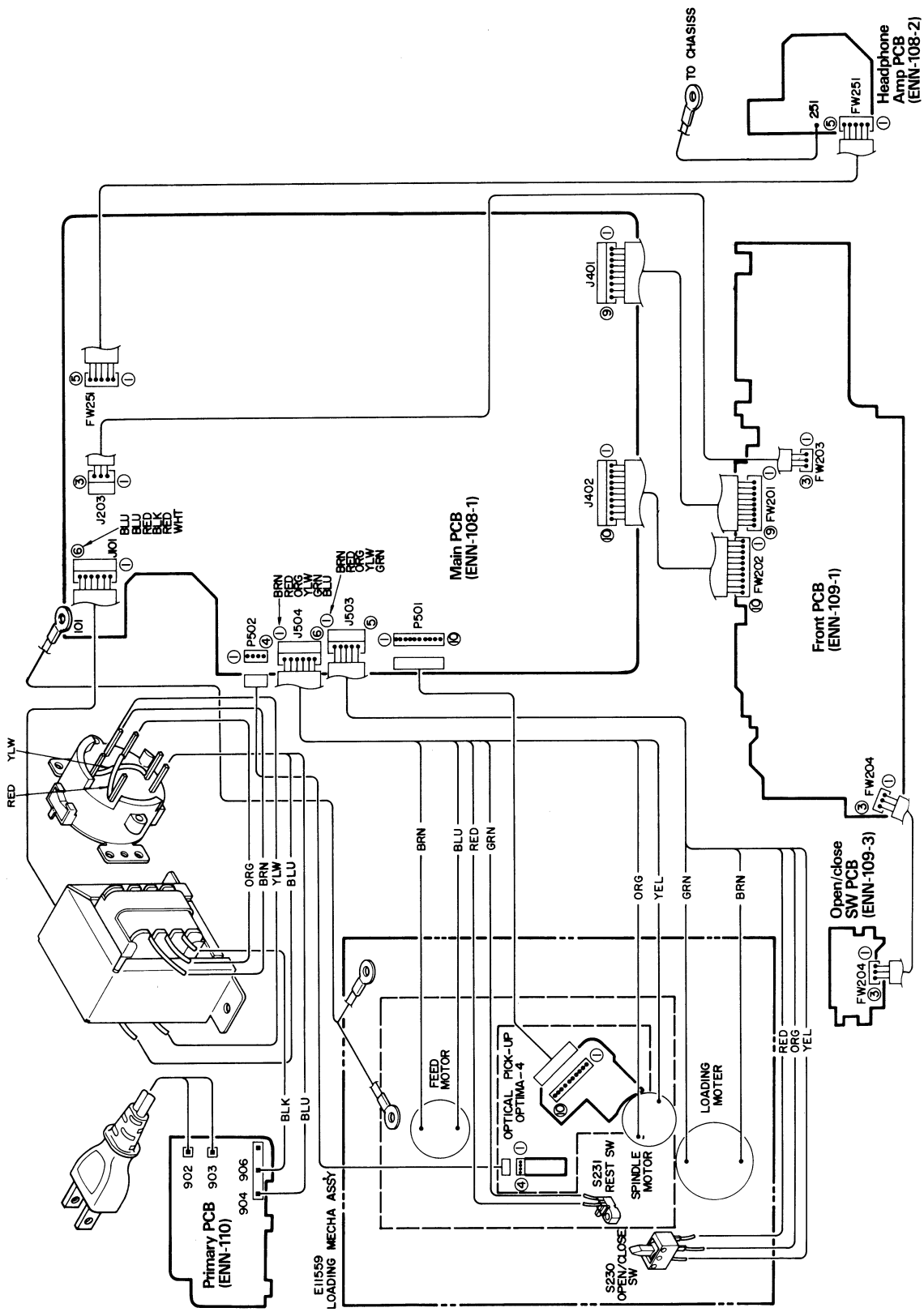


Audio section (from D/A on)

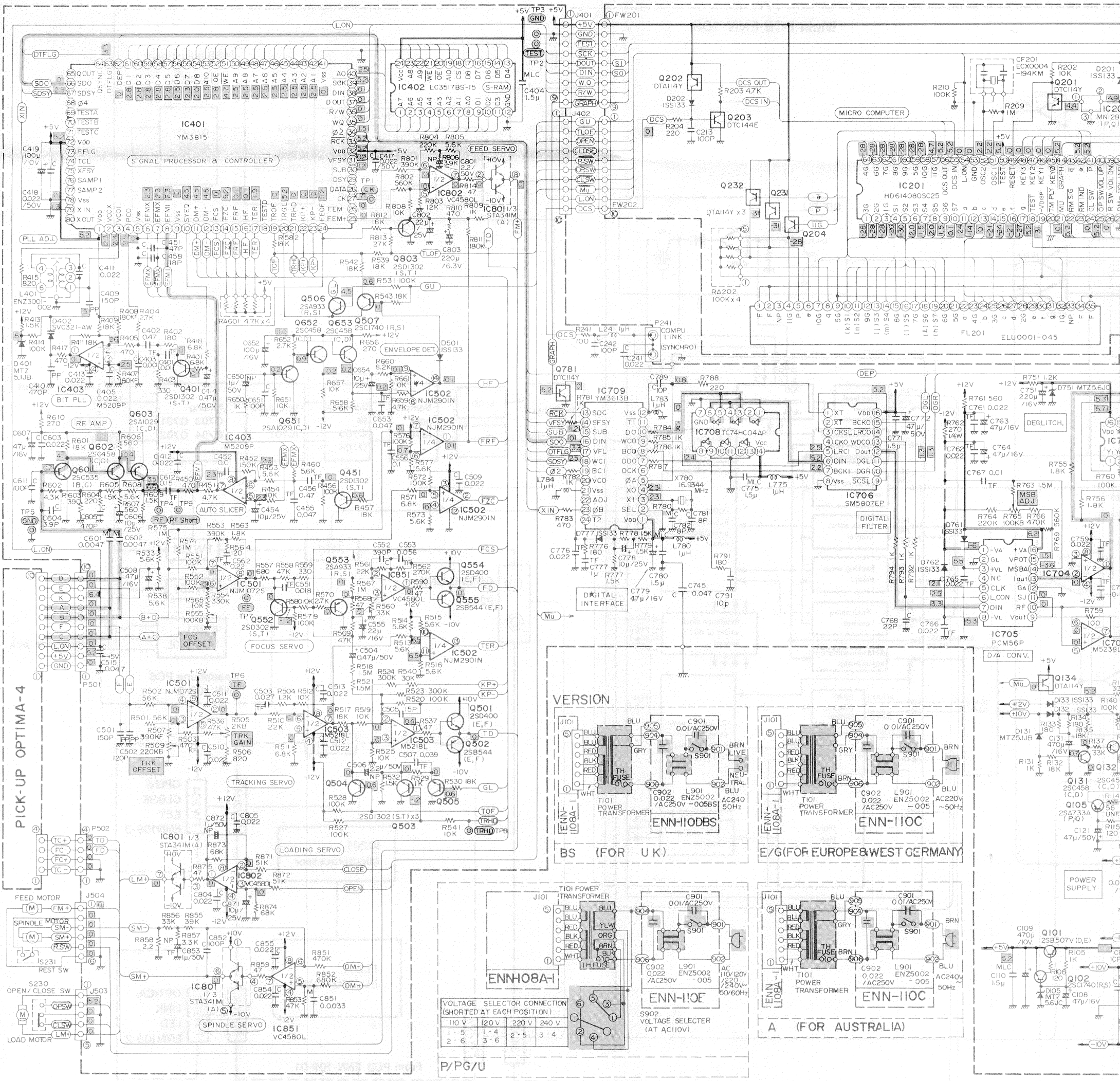

START
Switch on the power and play a disk.
Is there output at P701?
NO
YES
Is there output at J250?
NO
YES
Carry out MSB adjustment.
YES
Is the performance satisfactory?
NO
YES
END
Check for incorrect components or poor soldering between the DA converter and the pin jack.
Play back a track with no pre-emphasis.
Remove Q705 and Q706.
Does the performance meet standards?
YES
NO
Either Q705 or Q706 is defective.
Replace IC703.
Headphone board
Check the periphery of IC251.
Either IC701 or IC702 is defective.
NO
Does the performance meet standards?
YES
O.K.
Is there −12V at pin ④ of IC701 and pin ④ of IC702?
Is there +12V at pin ⑧ of IC701 and pin ⑧ of IC702?
NO
Check the power supply circuit.
YES
Is there output at pins①and⑦of IC701?
YES
Are the base voltages for Q701-Q704 about −11V?
NO
Check the periphery of Q133 and the connects Q132 and Q131
YES
Either one of the transistors Q701-Q704 is defective or there is poor soldering around them.
NO
Is there output at pins①and⑦of IC702?
YES
NO
Check the periphery of IC703 and IC705.
Is there −6.6V at pins ⑦ and ② of IC703?
NO
Either there is poor soldering around IC703 or D751, D752 are defective.
YES
Do the signals shown in Photo-graph A appear at pins⑨and ⑪ of IC703?
NO
Check the periphery of IC706.
YES
IC703 is defective

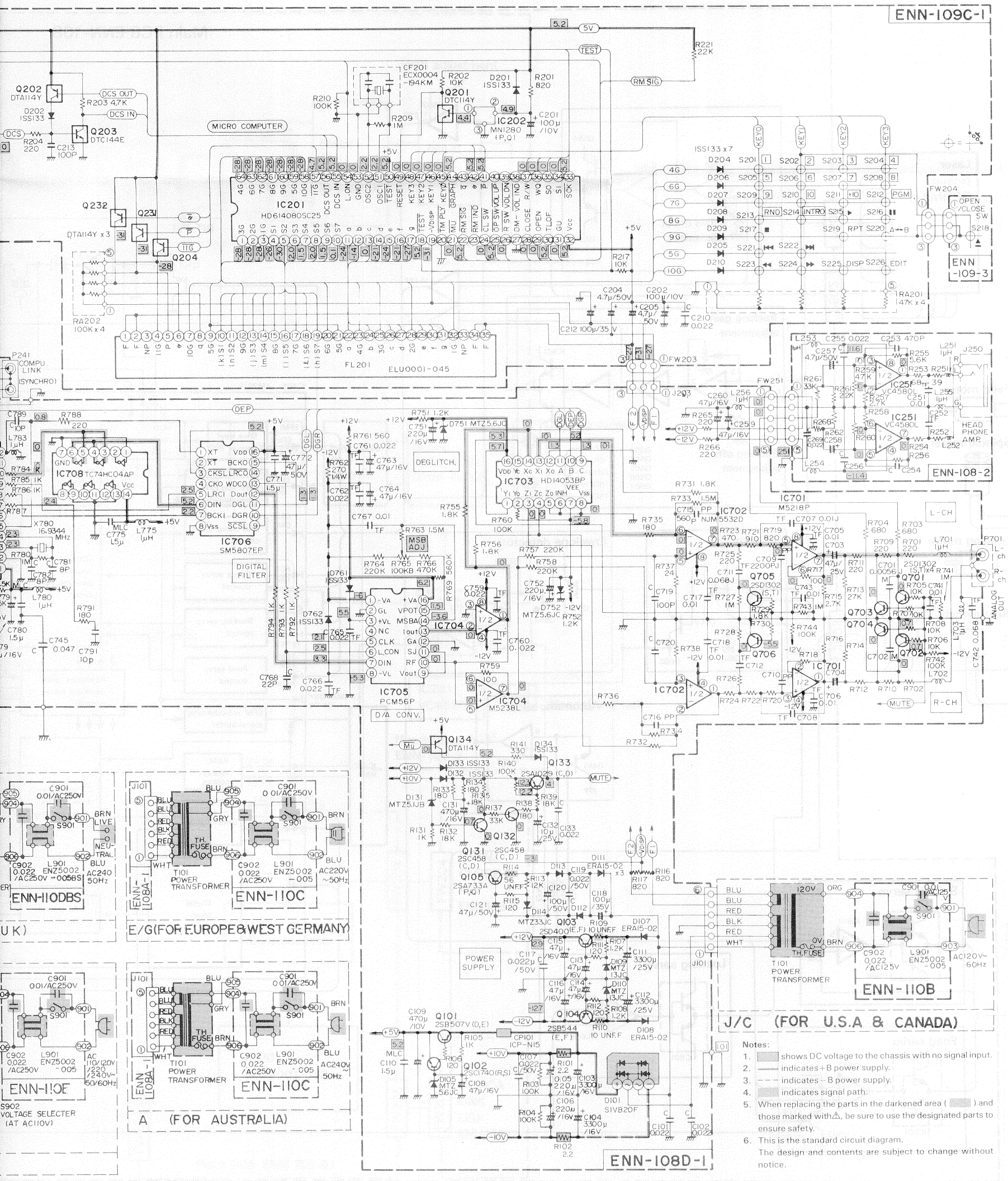
Deglitcher signal (Pin 9 of IC 703)

Connection Diagram



Schematic Diagram



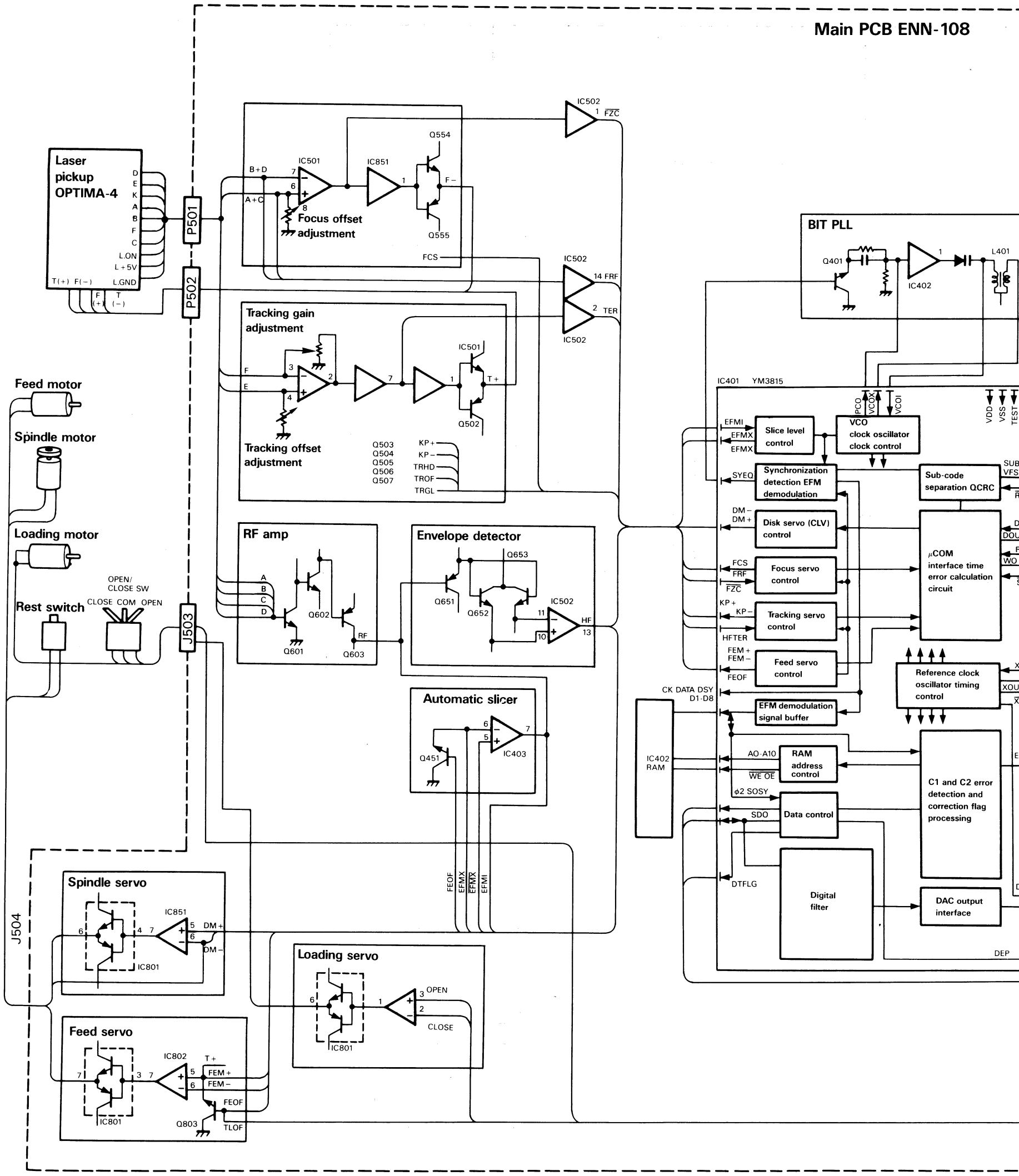


Notes:

1. ▭ shows DC voltage to the chassis with no signal input.
2. —— indicates +B power supply.
3. - - - indicates -B power supply.
4. ▭ indicates signal path.
5. When replacing the parts in the darkened area (▭) and those marked with ⚠, be sure to use the designated parts to ensure safety.
6. This is the standard circuit diagram.
   The design and contents are subject to change without notice.

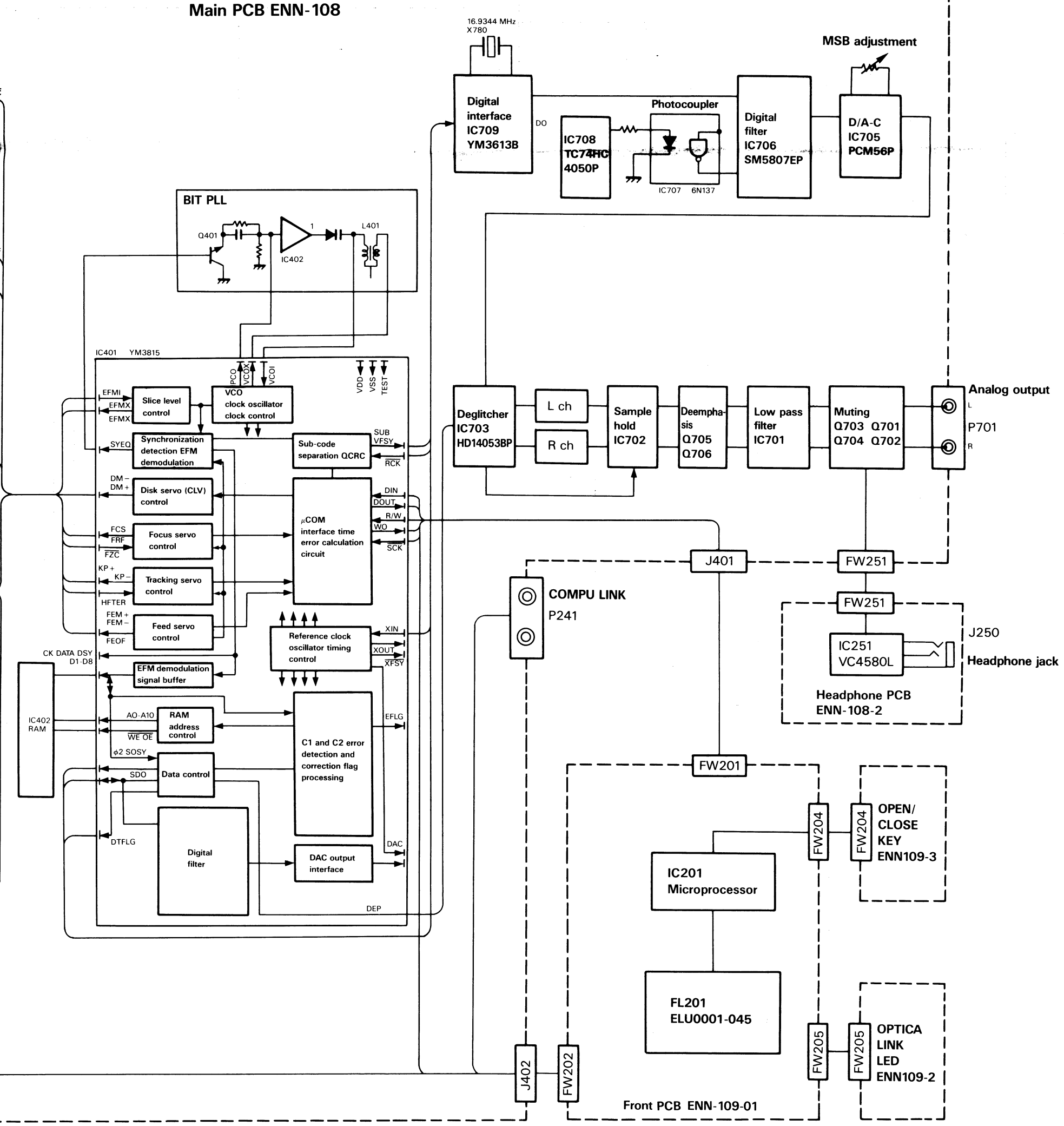
(No. 20054)

Block Diagram



(NO. 20054)

Main PCB ENN-108



PARTS LIST

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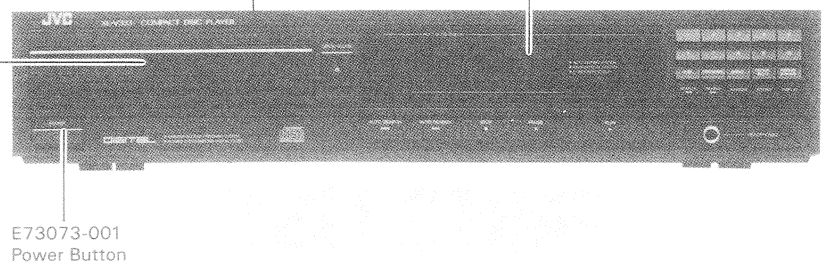
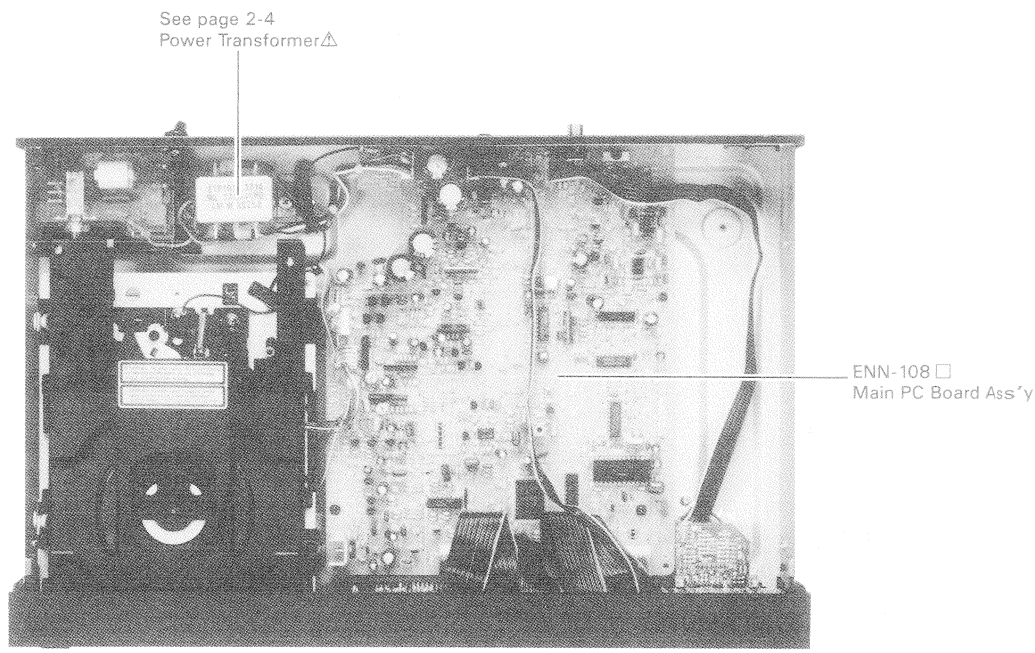
Main Parts Locations

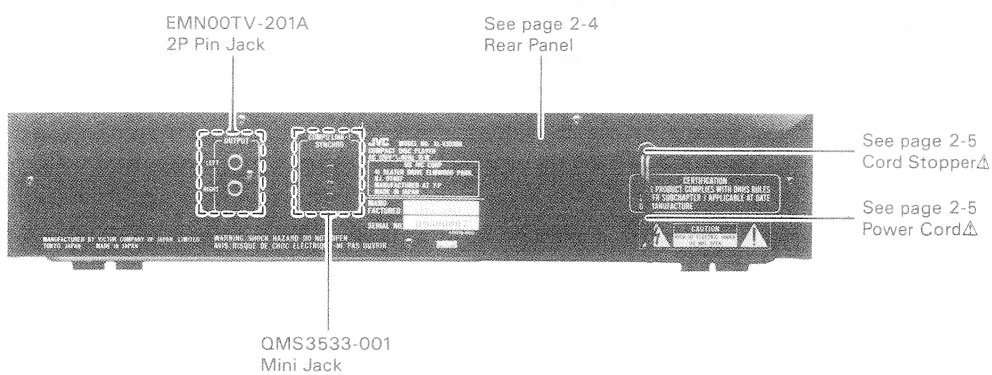
■ Front View



■ Top View

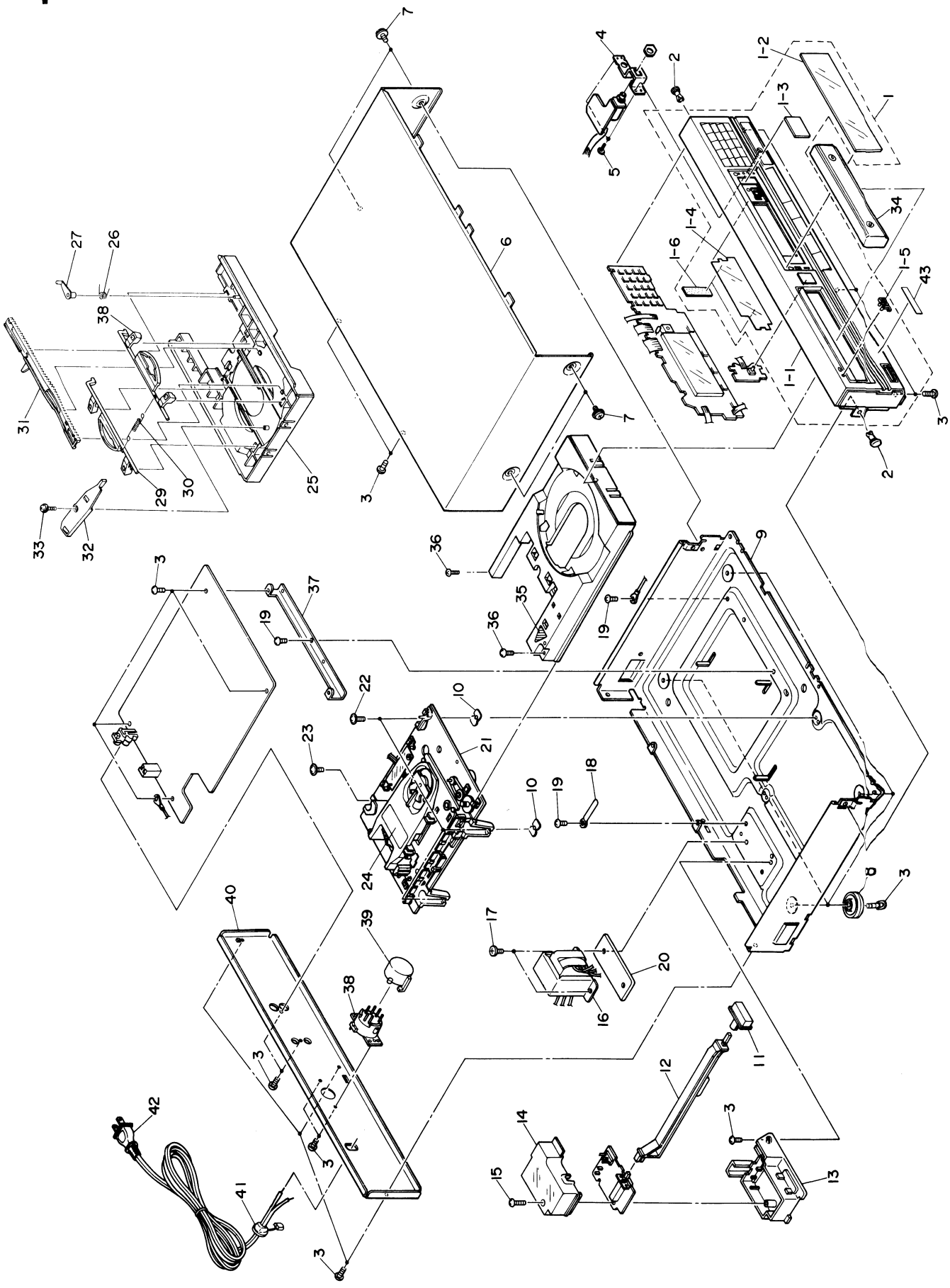


■ Rear View



⚠: Safety Parts

Exploded View and Parts List



⚠	Item	Part Number	Part Name	Q'ty	Description	Areas
	1	EFP-XLV333BKE	Front Panel Ass'y	1		
	1-1	E25929-201	Front Panel	1		
	1-2	E305093-101	Window Screen	1		
	1-3	E74501-101	Ornament	1		
	1-4	E74499-002	FL Screen	1		
	1-5	E72968-001	JVC Mark	1		
	1-6	E74833-001	Spacer	2		
	2	E48729-009	Plastic Rivet	2		
	3	SBSE3008M	Screw	19		Except U, P, PG
		SBSE3008M	Screw	21		U, P, PG
	4	E74500-001	Hed Phon Bracket	1		
	5	SBSF3008M	Screw	2		
	6	E25887-002	Metal Cover	1		
	7	E61660-004	Special Screew	4		
	8	E47227-026	Foot	4		
	9	E11621-102	Chassis Bsae	1		
	10	E74767-102	Spacer	2		
	11	E73073-001	Power Button	1		
	12	E305081-102	Push Shaft	1		
	13	E25874-003	Primary Case	1		Except J, C
		E25874-004	Primary Case	1		J, C
	14	E25875-001	Primaly Cover	1		Except J, C
		E25875-002	Primaly Cover	1		J, C
	15	SBSF3010M	Screw	1		
⚠	16	ETP1010-38JA	Power Transformer	1		J, C
⚠		ETP1010-38MA	Power Transformer	1		U, P, PG
⚠		ETP1010-38EA	Power Transformer	1		E, EF, A, ,G
⚠		ETP1010-38EABS	Power Transformer	1		BS
	17	E65389-006	Special Screw	2		
	18	E72018-001	Wire Cramp	1		
	19	SBSE3006CC	Screw	3		
	20	E74775-001	Sheet	1		
	21	———	Mechanism Base Ass'y	1	See Pge 2-6	
	22	E73265-003	Special Screw	3		
	23	E74727-001	Special Screw	1		
	24	E303875-002	Caution Label	3		
	25	E11557-003	Tray	1		
	26	E74328-001	Lock Spring	1		
	27	E74327-003	Lock Lever	1		
	28	E304989-002	Lifter	1	Left	
	29	E304990-002	Lifter	1	Right	
	30	E74905-001	Spring	1	Lifter	
	31	E304987-005	Rack	1		
	32	E304988-001	Link	1		
	33	E72405-001	Special Screw	1		
	34	E305101-001	Fitting	1		
	35	E71541-001	Hazard Symbol Label	1		E, EF
	36	SBSF3012Z	Screw	2		
	37	E305225-001	Circuit Board Bracket	1		
⚠	38	QSR0085-008U	Voltage Selector	1		U, P, PG
	39	E302764-001	Voltage Selector Cover	1		U, P, PG
	40	E25885-001	Rear Panel	1		J
		E25885-402	Rear Panel	1		C, E, EF, A, G, BS
		E25885-003	Rear Panel	1		U, P, PG
	–	E25536-018	Rating Label	1		J
	–	E25536-118	Rating Label	1		J
	–	E25536-218	Rating Label	1		J
	–	E25096-153	Rating Label	1		C
	–	E25096-353	Rating Label	1		U, P, PG

⚠: Safety parts

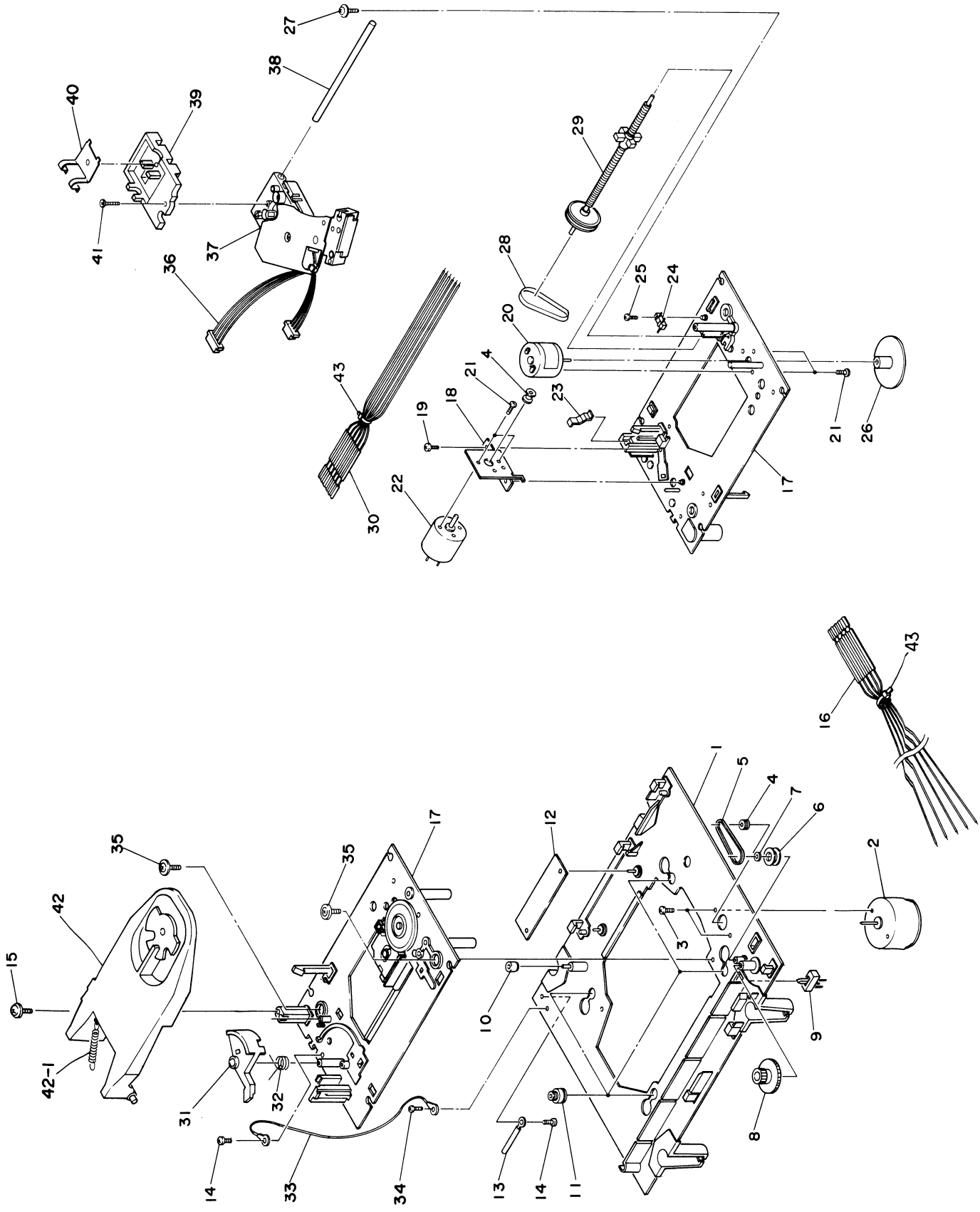
⚠	Item	Part Number	Part Name	Q'ty	Description	Areas
	–	E25096-553	Rating Label	1		E, EF
	–	E25096-554	Rating Label	1	Made in Singapol	E, EF
	–	E25096-553F	Rating Label	1		G
	–	E25096-554F	Rating Label	1	Made in Singapol	G
⚠	41	QHS3876-162	Cord Stopper	1		Except BS
⚠		QHS3876-162BS	Cord Stopper	1		BS
⚠		QMP1200-200	Power Cord	1		J, C
⚠	42	QMP2560-244	Power Cord	1		A
⚠		QMP7600-200	Power Cord	1		U, P, PG
⚠		QMP3900-200	Power Cord	1		E, EF, G
⚠		QMP9017-008BS	Power Cord	1		BS
	43	E49267-001	Origin Marking Label	1	Made in Japan	BS
		E49267-004	Origin Marking Label	1	Made in Singapol	BS

⚠: Safety Parts

The Marks for Designated Areas

J.....U.S.A.
C.....Canada
E,EF.....Continental Europe
A.....Australia
G.....West Germany
BS.....U.K.
P,PG.....U.S. Military Market
U.....Other Countries
No mark indicates all areas.

Mechanism Assembly



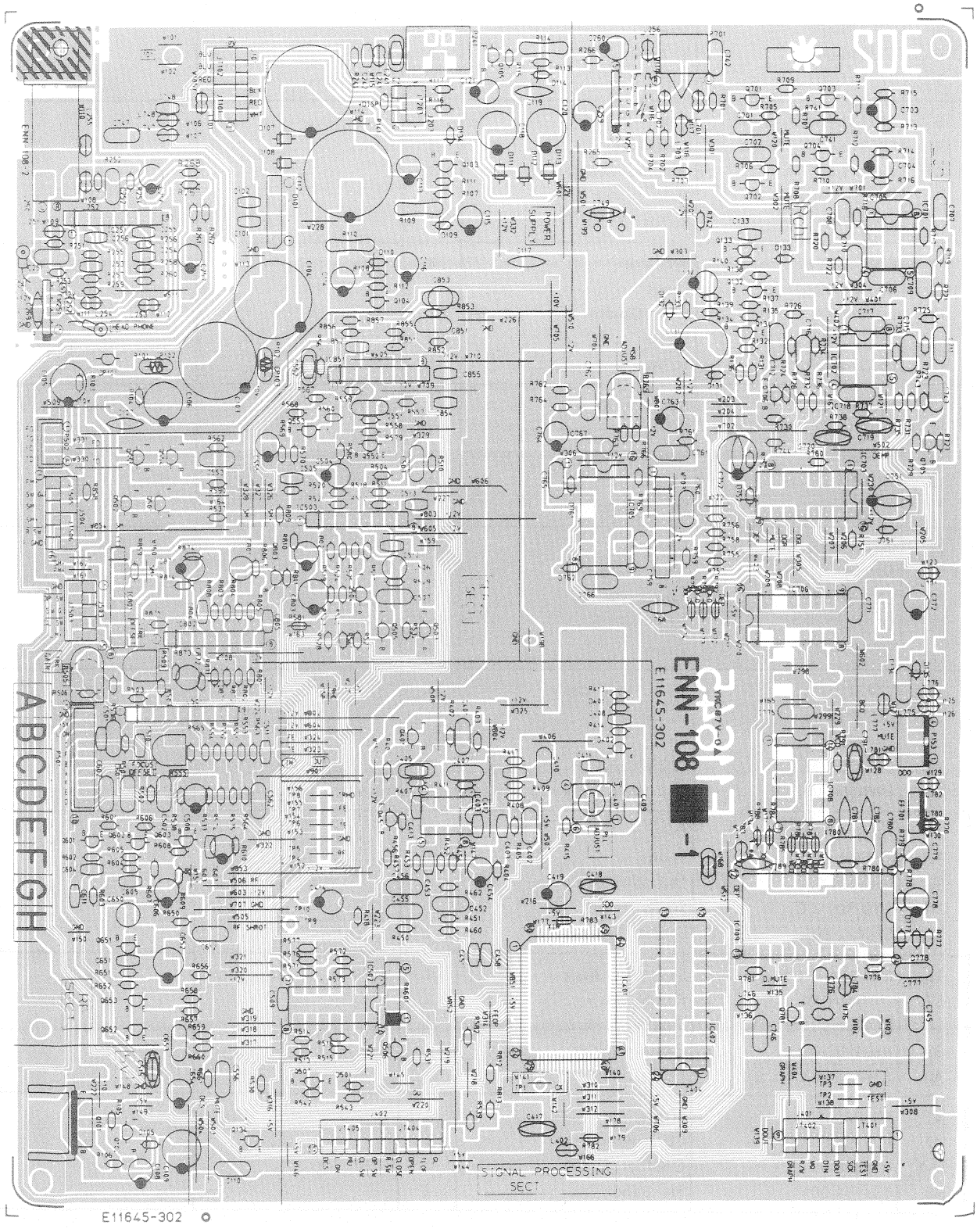
■ Parts List

Item	Part Number	Part Name	Q'ty	Description	Areas
1	E11554-001	Base Ass'Y	1		
2	MMN-6F1LB8Q	Motor	1		
3	SDSP2603N	Screw	2		
4	E73060-001	M. Pulley	2		
5	E74347-001	Belt	1		
6	E74323-001	Gear	1		
7	E60912-001	Speed Nut	1		
8	E74325-001	Loading Gear	1		
9	ESS2100-003	Slide Switch	1		
10	E70267-003	Rubber Tube	1		
11	E74349-001	Insulator	4		
12	E74326-002	Sheet	1		
13	PU49485-1	Wire Clamp	1		
14	SBSE3005Z	Screw	2		
15	E65923-004	Screw	1		
16	EWR55A-001	Flat Wire	1	5 Pin	
17	E11580-002	Mechanism Base Ass'Y	1		
18	E74421-001	Motor Bracket	1		
19	SBSE3006Z	Screw	1		
20	E74539-001	Spindle Motor	1		
21	SDSP2003N	Screw	4		
22	MDN-4RA3EWA	Feed Motor	1		
23	E72764-001	Leaf Spring	1		
24	QSP2K11-E02	Push Switch	1		
25	SPSF2010Z	Screw	1		
26	E74711-002	Turn Table Ass'y	1		
27	E65923-005	Screw	1		
28	E74305-001	Belt	1		
29	E74370-002	S. Shaft Ass'y	1		
30	EWR56A-002	SKT Wire Ass'y	1	6 Pin	
31	E305034-001	Cam	1		
32	E74351-001	Spring	1		
33	EWT021-030	TER Wire Ass'y	1		
34	SDSE3006CC	Screw	1		
35	E74422-001	Special Screw	2		
36	EWS25A-B104	SKT Wire Ass'y	1	10 Pin	
37	OPTIMA-4S	Pickup Ass'y	1		
38	E74930-001	Shaft	1		
39	E304992-002	Pickup Holder	1		
40	E74493-001	Leaf Spring	1		
41	SDSP2006Z	Screw	1		
42	E25796-003	CD Holder Unit	1		
42-1	E74348-001	Clamper Spring	1		
43	E33754-001	Tie Band	2		

Printed Circuit Board Ass'y and Parts List

■ ENN-108 □ Main PC Board Ass'y

Note: ENN-108 □ Varies according to the areas employed. See note (1) when placing an order.



Note (1)

PC Board Ass'y	Designated Areas
ENN-108 D	U.S.A., Canada, Australia, U.S. Military Market, U.K., Continental Europe, Other Countries
ENN-108 E	West Germany

TRANSISTORS

⚠	ITEM	PART NUMBER	DESCRIPTION	MAKER	AREA
	Q101	2SB507V(D,E)	SILICON	SANYO	
	Q102	2SC1740S(R,S)	SILICON		
	Q103	2SD400MP(E,F)	SILICON	SANYO	
	Q104	2SB544MP(E,F)	SILICON	SANYO	
	Q105	2SA733A(P,Q)	SILICON	NEC	
	Q131	2SC458(C,D)	SILICON	HITACHI	
	Q132	2SC458(C,D)	SILICON	HITACHI	
	Q133	2SA1029(C,D)	SILICON	HITACHI	
	Q134	DTA114YS	SILICON	ROHM	
	Q401	2SD1302(S,T)	SILICON	MATSUSHITA	
	Q451	2SD1302(S,T)	SILICON	MATSUSHITA	
	Q501	2SD400MP(E,F)	SILICON	SANYO	
	Q502	2SB544MP(E,F)	SILICON	SANYO	
	Q503	2SD1302(S,T)	SILICON	MATSUSHITA	
	Q504	2SD1302(S,T)	SILICON	MATSUSHITA	
	Q505	2SD1302(S,T)	SILICON	MATSUSHITA	
	Q506	2SA933(R,S)	SILICON	ROHM	
	Q507	2SC1740S(R,S)	SILICON		
	Q552	2SD1302(S,T)	SILICON	MATSUSHITA	
	Q553	2SA933(R,S)	SILICON	ROHM	
	Q554	2SD400MP(E,F)	SILICON	SANYO	
	Q555	2SB544MP(E,F)	SILICON	SANYO	
	Q601	2SC535(B,C)	SILICON	HITACHI	
	Q602	2SC458(C,D)	SILICON	HITACHI	
	Q603	2SA1029(C,D)	SILICON	HITACHI	
	Q651	2SA1029(C,D)	SILICON	HITACHI	
	Q652	2SC458(C,D)	SILICON	HITACHI	
	Q653	2SC458(C,D)	SILICON	HITACHI	
	Q701	2SD1302(S,T)	SILICON	MATSUSHITA	
	Q702	2SD1302(S,T)	SILICON	MATSUSHITA	
	Q703	2SD1302(S,T)	SILICON	MATSUSHITA	
	Q704	2SD1302(S,T)	SILICON	MATSUSHITA	
	Q705	2SD1302(S,T)	SILICON	MATSUSHITA	
	Q706	2SD1302(S,T)	SILICON	MATSUSHITA	
	Q781	DTC114YS	SILICON	ROHM	
	Q803	2SD1302(S,T)	SILICON	MATSUSHITA	

I. C. S

⚠	ITEM	PART NUMBER	DESCRIPTION	MAKER	AREA
	IC251	VC4580L	I.C.		
	IC401	YM3815	I.C.		
	IC402	LC3517BS-15	I.C.	SANYO	
	IC403	M5209P	I.C.	MITSUBISHI	
	IC501	NJM072S	I.C.		
	IC502	NJM2901N	I.C.		
	IC503	M5218L	I.C.	MITSUBISHI	
	IC701	M5218P	I.C.	MITSUBISHI	
	IC702	NJM5532D	I.C.		
	IC703	HD14053BP	I.C.	HITACHI	
	IC704	M5238L	I.C.	MITSUBISHI	
	IC705	PCM56P	I.C.		
	IC706	SM5807EP	I.C.		
	IC708	TC74HC04AP	I.C.		
	IC709	YM3613B	I.C.		
	IC801	STA341M(A)	I.C.		
	IC802	VC4580L	I.C.		
	IC851	VC4580L	I.C.		

DIODES

⚠	ITEM	PART NUMBER	DESCRIPTION	MAKER	AREA
	D101	S1VB20F	SILICON		
	D105	MTZ5.6JC	ZENER	ROHM	
	D107	ERA15-02L19	SILICON		
	D108	ERA15-02L19	SILICON		
	D109	MTZ13JC	ZENER	ROHM	
	D110	MTZ13JC	ZENER	ROHM	
	D111	ERA15-02L19	SILICON		
	D112	ERA15-02L19	SILICON		
	D113	ERA15-02L19	SILICON		
	D114	MTZ33JC	ZENER	ROHM	
	D131	MTZ5.1JB	ZENER	ROHM	
	D132	1SS133	SILICON	ROHM	
	D133	1SS133	SILICON	ROHM	
	D134	1SS133	SILICON	ROHM	
	D401	MTZ5.1JB	ZENER	ROHM	
	D402	SVC321-AW	VARICAP	SANYO	
	D501	1SS133	SILICON	ROHM	
	D751	MTZ5.6JC	ZENER	ROHM	
	D752	MTZ5.6JC	ZENER	ROHM	
	D761	1SS133	SILICON	ROHM	
	D762	1SS133	SILICON	ROHM	
	D777	1SS133	SILICON	ROHM	
	D778	1SS133	SILICON	ROHM	

CAPACITORS

⚠	ITEM	PART NUMBER	DESCRIPTION			AREA
	C101	QCHB1EZ-223	0.022MF	25V	CERAMIC	
	C102	QCHB1EZ-223	0.022MF	25V	CERAMIC	
	C103	QETB1CM-338	3300MF	16V	ELECTRO	
	C104	QETB1CM-338	3300MF	16V	ELECTRO	
	C105	QETB1CM-227	220MF	16V	ELECTRO	
	C106	QETB1CM-227	220MF	16V	ELECTRO	
	C107	QCF21HP-223	0.022MF	50V	CERAMIC	
	C108	QETB1CM-476	47MF	16V	ELECTRO	
	C109	QETB1AM-477	470MF	10V	ELECTRO	
	C110	QCZ0205-155	1.5MF	25V	CERAMIC	
	C111	QETB1EM-338	3300MF	25V	ELECTRO	
	C112	QETB1EM-338	3300MF	25V	ELECTRO	
	C113	QETB1CM-476	47MF	16V	ELECTRO	
	C114	QETB1CM-476	47MF	16V	ELECTRO	
	C115	QETB1CM-476	47MF	16V	ELECTRO	
	C116	QETB1CM-476	47MF	16V	ELECTRO	
	C117	QCF21HP-223	0.022MF	50V	CERAMIC	
	C118	QETB1VM-107	100MF	35V	ELECTRO	
	C119	QCF21HP-223	0.022MF	50V	CERAMIC	
	C120	QETB1HM-107	100MF	50V	ELECTRO	
	C121	QETB1HM-476	47MF	50V	ELECTRO	
	C131	QETB1CM-477	470MF	16V	ELECTRO	
	C132	QETB1EM-106	10MF	25V	ELECTRO	
	C133	QCHB1EZ-223	0.022MF	25V	CERAMIC	
	C241	QCHB1EZ-223	0.022MF	25V	CERAMIC	
	C242	QCBB1HK-101	100PF	50V	CERAMIC	
	C251	QFV81HJ-103	0.01MF	50V	T.FILM	
	C252	QFV81HJ-103	0.01MF	50V	T.FILM	
	C253	QCBB1HK-471	470PF	50V	CERAMIC	
	C254	QCBB1HK-471	470PF	50V	CERAMIC	
	C255	QCHB1EZ-223	0.022MF	25V	CERAMIC	
	C256	QCHB1EZ-223	0.022MF	25V	CERAMIC	
	C257	QETB1HM-475	4.7MF	50V	ELECTRO	
	C258	QETB1HM-475	4.7MF	50V	ELECTRO	
	C259	QETB1CM-476	47MF	16V	ELECTRO	
	C260	QETB1CM-476	47MF	16V	ELECTRO	
	C269	QCHB1EZ-223	0.022MF	25V	CERAMIC	
	C401	QFV81HJ-103	0.01MF	50V	T.FILM	
	C402	QFV81HJ-474	0.47MF	50V	T.FILM	
	C403	QCGB1HK-102	1000PF	50V	CERAMIC	
	C404	QCZ0205-155	1.5MF	25V	CERAMIC	
	C405	QCHB1EZ-223	0.022MF	25V	CERAMIC	
	C409	QFP81HJ-151	150PF	50V	POLY	
	C410	QFP81HJ-471	470PF	50V	POLY	
	C411	QCHB1EZ-223	0.022MF	25V	CERAMIC	
	C412	QCHB1EZ-223	0.022MF	25V	CERAMIC	
	C413	QCHB1EZ-223	0.022MF	25V	CERAMIC	
	C414	QETB1HM-474	0.47MF	50V	ELECTRO	
	C417	QCF21HP-223	0.022MF	50V	CERAMIC	
	C418	QCF21HP-223	0.022MF	50V	CERAMIC	
	C419	QETB1AM-107	100MF	10V	ELECTRO	
	C451	QCSB1HJ-470	47PF	50V	CERAMIC	
	C452	QFV81HJ-103	0.01MF	50V	T.FILM	
	C454	QETB1EM-106	10MF	25V	ELECTRO	
	C455	QFV81HJ-473	0.047MF	50V	T.FILM	

⚠ Safety Parts

CAPACITORS

⚠	ITEM	PART NUMBER	DESCRIPTION			AREA
	C456	QFV81HJ-474	0.47MF	50V	T.FILM	
	C458	QCSB1HJ-180	18PF	50V	CERAMIC	
	C501	QFP81HJ-151	150PF	50V	POLY	
	C502	QFP81HJ-121	120PF	50V	POLY	
	C503	QFV81HJ-273	0.027MF	50V	T.FILM	
	C505	QCSB1HJ-150	15PF	50V	CERAMIC	
	C506	QEN51HM-225	2.2MF	50V	NON POLE	
	C507	QFV81HJ-393	0.039MF	50V	T.FILM	
	C508	QETB1CM-476	47MF	16V	ELECTRO	
	C509	QCHB1EZ-223	0.022MF	25V	CERAMIC	
	C510	QCHB1EZ-223	0.022MF	25V	CERAMIC	
	C511	QCHB1EZ-223	0.022MF	25V	CERAMIC	
	C512	QCHB1EZ-223	0.022MF	25V	CERAMIC	
	C513	QCHB1EZ-223	0.022MF	25V	CERAMIC	
	C515	QCF21HP-473	0.047MF	50V	CERAMIC	
	C551	QFV81HJ-183	0.018MF	50V	T.FILM	
	C552	QCBB1HK-391	390PF	50V	CERAMIC	
	C553	QFV81HJ-563	0.056MF	50V	T.FILM	
	C555	QETB1CM-226	22MF	16V	ELECTRO	
	C556	QFV81HJ-104	0.1MF	50V	T.FILM	
	C562	QFV81HJ-224	0.22MF	50V	T.FILM	
	C601	QFN81HJ-472	4700PF	50V	MYLAR	
	C602	QFN81HJ-472	4700PF	50V	MYLAR	
	C603	QCHB1EZ-223	0.022MF	25V	CERAMIC	
	C604	QCSB1HJ-3R9	3.9PF	50V	CERAMIC	
	C605	QCBB1HK-471	470PF	50V	CERAMIC	
	C606	QETB1EM-106	10MF	25V	ELECTRO	
	C607	QETB1CM-476	47MF	16V	ELECTRO	
	C611	QCBB1HK-101	100PF	50V	CERAMIC	
	C612	QFV81HJ-154	0.15MF	50V	T.FILM	
	C650	QEN51HM-105	1MF	50V	NON POLE	
	C651	QCBB1HK-101	100PF	50V	CERAMIC	
	C652	QETB1CM-107	100MF	16V	ELECTRO	
	C653	QFV81HJ-473	0.047MF	50V	T.FILM	
	C654	QETB1EM-106	10MF	25V	ELECTRO	
	C701	QFN81HJ-562	5600PF	50V	MYLAR	
	C702	QFN81HJ-562	5600PF	50V	MYLAR	
	C703	QETB1EM-476	47MF	25V	ELECTRO	
	C704	QETB1EM-476	47MF	25V	ELECTRO	
	C705	QFV81HJ-103	0.01MF	50V	T.FILM	
	C706	QFV81HJ-103	0.01MF	50V	T.FILM	
	C707	QFV81HJ-103	0.01MF	50V	T.FILM	
	C708	QFV81HJ-103	0.01MF	50V	T.FILM	
	C709	QFP81HJ-222	2200PF	50V	POLY	
	C710	QFP81HJ-222	2200PF	50V	POLY	
	C711	QFV81HJ-683	0.068MF	50V	T.FILM	
	C712	QFV81HJ-683	0.068MF	50V	T.FILM	
	C715	QFP81HJ-561	560PF	50V	POLY	
	C716	QFP81HJ-561	560PF	50V	POLY	
	C717	QFV81HJ-103	0.01MF	50V	T.FILM	
	C718	QFV81HJ-103	0.01MF	50V	T.FILM	
	C719	QCS21HJ-101	100PF	50V	CERAMIC	
	C720	QCS21HJ-101	100PF	50V	CERAMIC	
	C741	QFV81HJ-103	0.01MF	50V	T.FILM	
	C742	QFV81HJ-683	0.068MF	50V	T.FILM	
	C743	QFV81HJ-103	0.01MF	50V	T.FILM	
	C745	QCF21HP-473	0.047MF	50V	CERAMIC	
	C751	QETB1CM-227	220MF	16V	ELECTRO	
	C752	QETB1CM-227	220MF	16V	ELECTRO	
	C759	QFV81HJ-223	0.022MF	50V	T.FILM	
	C760	QFV81HJ-223	0.022MF	50V	T.FILM	
	C761	QFV81HJ-223	0.022MF	50V	T.FILM	
	C762	QFV81HJ-223	0.022MF	50V	T.FILM	
	C763	QETB1CM-476	47MF	16V	ELECTRO	
	C764	QETB1CM-476	47MF	16V	ELECTRO	
	C765	QFV81HJ-223	0.022MF	50V	T.FILM	
	C766	QFV81HJ-223	0.022MF	50V	T.FILM	
	C767	QFV81HJ-223	0.022MF	50V	T.FILM	
	C768	QCS21HJ-330	33PF	50V	CERAMIC	
	C771	QCZ0205-155	1.5MF	25V	CERAMIC	
	C772	QETB1HM-475	4.7MF	50V	ELECTRO	
	C775	QCZ0205-155	1.5MF	25V	CERAMIC	
	C776	QFV81HJ-223	0.022MF	50V	T.FILM	
	C777	QFV81HJ-105	1MF	50V	T.FILM	
	C779	QETB1CM-476	47MF	16V	ELECTRO	
	C780	QCZ0205-155	1.5MF	25V	CERAMIC	
	C781	QCS21HJ-8R0	8PF	50V	CERAMIC	
	C782	QCS21HJ-8R0	8PF	50V	CERAMIC	
	C789	QCS21HJ-100	10PF	50V	CERAMIC	
	C791	QCSB1HJ-100	10PF	50V	CERAMIC	
	C801	QEN51HM-225	2.2MF	50V	NON POLE	
	C802	QETB1EM-226	22MF	25V	ELECTRO	
	C803	QETB0JM-227	220MF	6.3V	ELECTRO	
	C804	QCHB1EZ-223	0.022MF	25V	CERAMIC	
	C805	QCHB1EZ-223	0.022MF	25V	CERAMIC	
	C851	QFN81HJ-332	3300PF	50V	MYLAR	
	C852	QCBB1HK-101	100PF	50V	CERAMIC	
	C853	QFV51HM-683	0.068MF	50V	T.FILM	
	C854	QCHB1EZ-223	0.022MF	25V	CERAMIC	
	C855	QCHB1EZ-223	0.022MF	25V	CERAMIC	

CAPACITORS

⚠	ITEM	PART NUMBER	DESCRIPTION			AREA
	C871	QETB1EM-106	10MF	25V	ELECTRO	
	C872	QEN51HM-105	1MF	50V	NON POLE	

RESISTORS

⚠	ITEM	PART NUMBER	DESCRIPTION			AREA
	R101	PTH61G30BD2R2N	2.2K		POSISTOR	
	R102	PTH61G30BD2R2N	2.2K		POSISTOR	
	R103	QRD167J-104	100K	1/6W	CARBON	
	R104	QRD167J-104	100K	1/6W	CARBON	
	R105	QRD167J-102	1K	1/6W	CARBON	
	R106	QRD167J-121	120	1/6W	CARBON	
	R107	QRD167J-122	1.2K	1/6W	CARBON	
	R108	QRD167J-122	1.2K	1/6W	CARBON	
⚠	R109	QRZ0077-100	10	1/4W	FUSIBLE	
⚠	R110	QRZ0077-100	10	1/4W	FUSIBLE	
	R111	QRD167J-121	120	1/6W	CARBON	
	R112	QRD167J-121	120	1/6W	CARBON	
	R113	QRD167J-123	12K	1/6W	CARBON	
⚠	R114	QRZ0077-560	56	1/4W	FUSIBLE	
	R115	QRD167J-121	120	1/6W	CARBON	
	R116	QRD167J-821	820	1/6W	CARBON	
	R117	QRD167J-821	820	1/6W	CARBON	
	R131	QRD167J-102	1K	1/6W	CARBON	
	R132	QRD167J-183	18K	1/6W	CARBON	
	R133	QRD167J-181	180	1/6W	CARBON	
	R134	QRD167J-181	180	1/6W	CARBON	
	R135	QRD167J-183	18K	1/6W	CARBON	
	R137	QRD167J-333	33K	1/6W	CARBON	
	R138	QRD167J-181	180	1/6W	CARBON	
	R139	QRD167J-183	18K	1/6W	CARBON	
	R140	QRD167J-104	100K	1/6W	CARBON	
	R141	QRD167J-331	330	1/6W	CARBON	
	R241	QRD167J-101	100	1/6W	CARBON	
	R251	QRD167J-390	39	1/6W	CARBON	
	R252	QRD167J-390	39	1/6W	CARBON	
	R253	QRD167J-680	68	1/6W	CARBON	
	R254	QRD167J-680	68	1/6W	CARBON	
	R255	QRD167J-562	5.6K	1/6W	CARBON	
	R256	QRD167J-562	5.6K	1/6W	CARBON	
	R257	QRD167J-272	2.7K	1/6W	CARBON	
	R258	QRD167J-272	2.7K	1/6W	CARBON	
	R259	QRD167J-473	47K	1/6W	CARBON	
	R260	QRD167J-473	47K	1/6W	CARBON	
	R261	QRD167J-223	22K	1/6W	CARBON	
	R262	QRD167J-223	22K	1/6W	CARBON	
	R265	QRD167J-221	220	1/6W	CARBON	
	R266	QRD167J-221	220	1/6W	CARBON	
	R267	QRD167J-333	33K	1/6W	CARBON	
	R268	QRD167J-333	33K	1/6W	CARBON	
	R401	QRD167J-682	6.8K	1/6W	CARBON	
	R402	QRD167J-181	180	1/6W	CARBON	
	R403	QRD167J-331	330	1/6W	CARBON	
	R404	QRD167J-272	2.7K	1/6W	CARBON	
	R405	QRD167J-471	470	1/6W	CARBON	
⚠	R407	QRV144F-1803	180K	1/4W	M.FILM	
⚠	R408	QRV144F-1803	180K	1/4W	M.FILM	
	R409	QRD167J-183	18K	1/6W	CARBON	
	R411	QRD167J-183	18K	1/6W	CARBON	
	R413	QRD167J-152	1.5K	1/6W	CARBON	
	R414	QRD167J-104	100K	1/6W	CARBON	
	R415	QRD167J-821	820	1/6W	CARBON	
	R417	QRD167J-471	470	1/6W	CARBON	
	R418	QRD167J-682	6.8K	1/6W	CARBON	
	R450	QRD167J-471	470	1/6W	CARBON	
	R451	QRD167J-472	4.7K	1/6W	CARBON	
	R452	QRD167J-154	150K	1/6W	CARBON	
	R453	QRD167J-562	5.6K	1/6W	CARBON	
	R454	QRD167J-103	10K	1/6W	CARBON	
	R456	QRD167J-104	100K	1/6W	CARBON	
	R457	QRD167J-183	18K	1/6W	CARBON	
	R460	QRD167J-562	5.6K	1/6W	CARBON	
	R501	QRD167J-563	56K	1/6W	CARBON	
	R502	QRD167J-563	56K	1/6W	CARBON	
⚠	R503	QRV144F-4703	470K	1/4W	M.FILM	
	R504	QRD167J-122	1.2K	1/6W	CARBON	
	R505	QVPE601-202	2K	0.15W	VARIABLE	
	R506	QRD167J-821	820	1/6W	CARBON	
⚠	R507	QRV144F-3903	390K	1/4W	M.FILM	
	R509	QVZ3518-224	220K	0.1W	VARIABLE	
	R510	QRD167J-223	22K	1/6W	CARBON	
	R511	QRD167J-682	6.8K	1/6W	CARBON	
	R512	QRD167J-103	10K	1/6W	CARBON	
	R513	QRD167J-562	5.6K	1/6W	CARBON	
	R514	QRD167J-562	5.6K	1/6W	CARBON	
	R515	QRD167J-562	5.6K	1/6W	CARBON	

⚠: Safety Parts

RESISTORS

⚠	ITEM	PART NUMBER	DESCRIPTION			AREA
	R516	QRD167J-562	5.6K	1/6W	CARBON	
	R517	QRD167J-183	18K	1/6W	CARBON	
	R519	QRD167J-103	10K	1/6W	CARBON	
	R520	QRD167J-104	100K	1/6W	CARBON	
	R523	QRD167J-304	300K	1/6W	CARBON	
	R524	QRD167J-304	300K	1/6W	CARBON	
	R525	QRD167J-103	10K	1/6W	CARBON	
	R527	QRD167J-104	100K	1/6W	CARBON	
	R528	QRD167J-104	100K	1/6W	CARBON	
	R529	QRD167J-102	1K	1/6W	CARBON	
	R530	QRD167J-183	18K	1/6W	CARBON	
	R531	QRD167J-104	100K	1/6W	CARBON	
	R532	QRD167J-152	1.5K	1/6W	CARBON	
	R533	QRD167J-562	5.6K	1/6W	CARBON	
	R536	QRD167J-473	47K	1/6W	CARBON	
	R537	QRD167J-470	47	1/6W	CARBON	
	R538	QRD167J-562	5.6K	1/6W	CARBON	
	R539	QRD167J-183	18K	1/6W	CARBON	
	R540	QRD167J-303	30K	1/6W	CARBON	
	R541	QRD167J-103	10K	1/6W	CARBON	
	R542	QRD167J-183	18K	1/6W	CARBON	
	R543	QRD167J-183	18K	1/6W	CARBON	
	R551	QRD167J-104	100K	1/6W	CARBON	
	R552	QRD167J-104	100K	1/6W	CARBON	
	R553	QRD167J-394	390K	1/6W	CARBON	
	R554	QRD167J-334	330K	1/6W	CARBON	
	R555	QVZ3518-104	100K	0.1W	VARIABLE	
	R557	QRD167J-681	680	1/6W	CARBON	
	R558	QRD167J-473	47K	1/6W	CARBON	
	R559	QRD167J-331	330	1/6W	CARBON	
	R560	QRD167J-333	33K	1/6W	CARBON	
	R561	QRD167J-223	22K	1/6W	CARBON	
	R562	QRD167J-274	270K	1/6W	CARBON	
	R563	QRD167J-182	1.8K	1/6W	CARBON	
	R564	QRD167J-121	120	1/6W	CARBON	
	R565	QRD167J-103	10K	1/6W	CARBON	
	R567	QRD167J-105	1M	1/6W	CARBON	
	R568	QRD167J-470	47	1/6W	CARBON	
	R569	QRD167J-473	47K	1/6W	CARBON	
	R570	QRD167J-272	2.7K	1/6W	CARBON	
	R571	QRD167J-682	6.8K	1/6W	CARBON	
	R572	QRD167J-104	100K	1/6W	CARBON	
	R573	QRD167J-562	5.6K	1/6W	CARBON	
	R574	QRD167J-105	1M	1/6W	CARBON	
	R575	QRD167J-105	1M	1/6W	CARBON	
	R576	QRD167J-104	100K	1/6W	CARBON	
	R577	QRD167J-562	5.6K	1/6W	CARBON	
	R579	QRD167J-104	100K	1/6W	CARBON	
	R580	QRD167J-103	10K	1/6W	CARBON	
	R582	QRD167J-183	18K	1/6W	CARBON	
	R590	QRD167J-470	47	1/6W	CARBON	
	R601	QRD167J-183	18K	1/6W	CARBON	
	R602	QRD167J-432	4.3K	1/6W	CARBON	
	R603	QRD167J-391	390	1/6W	CARBON	
	R604	QRD167J-221	220	1/6W	CARBON	
	R605	QRD167J-152	1.5K	1/6W	CARBON	
	R606	QRD167J-561	560	1/6W	CARBON	
	R607	QRD167J-561	560	1/6W	CARBON	
	R608	QRD167J-562	5.6K	1/6W	CARBON	
	R609	QRD167J-152	1.5K	1/6W	CARBON	
	R610	QRD167J-271	270	1/6W	CARBON	
	R650	QRD167J-102	1K	1/6W	CARBON	
	R651	QRD167J-103	10K	1/6W	CARBON	
	R652	QRD167J-272	2.7K	1/6W	CARBON	
	R656	QRD167J-271	270	1/6W	CARBON	
	R657	QRD167J-103	10K	1/6W	CARBON	
	R658	QRD167J-562	5.6K	1/6W	CARBON	
	R659	QRD167J-472	4.7K	1/6W	CARBON	
	R660	QRD167J-822	8.2K	1/6W	CARBON	
	R661	QRD167J-103	10K	1/6W	CARBON	
	R701	QRD167J-221	220	1/6W	CARBON	
	R702	QRD167J-221	220	1/6W	CARBON	
	R703	QRD167J-681	680	1/6W	CARBON	
	R704	QRD167J-681	680	1/6W	CARBON	
	R705	QRD167J-103	10K	1/6W	CARBON	
	R706	QRD167J-103	10K	1/6W	CARBON	
	R707	QRD167J-103	10K	1/6W	CARBON	
	R708	QRD167J-103	10K	1/6W	CARBON	
	R709	QRD167J-221	220	1/6W	CARBON	
	R710	QRD167J-221	220	1/6W	CARBON	
	R711	QRD167J-221	220	1/6W	CARBON	
	R712	QRD167J-221	220	1/6W	CARBON	
	R713	QRD167J-273	27K	1/6W	CARBON	
	R714	QRD167J-273	27K	1/6W	CARBON	
	R715	QRD167J-272	2.7K	1/6W	CARBON	
	R716	QRD167J-272	2.7K	1/6W	CARBON	
	R717	QRD167J-101	100	1/6W	CARBON	
	R718	QRD167J-101	100	1/6W	CARBON	
	R719	QRD167J-821	820	1/6W	CARBON	
	R720	QRD167J-821	820	1/6W	CARBON	

RESISTORS

⚠	ITEM	PART NUMBER	DESCRIPTION			AREA
	R721	QRD167J-911	910	1/6W	CARBON	
	R722	QRD167J-911	910	1/6W	CARBON	
	R723	QRD167J-471	470	1/6W	CARBON	
	R724	QRD167J-471	470	1/6W	CARBON	
	R725	QRD167J-221	220	1/6W	CARBON	
	R726	QRD167J-221	220	1/6W	CARBON	
	R727	QRD167J-105	1M	1/6W	CARBON	
	R728	QRD167J-105	1M	1/6W	CARBON	
	R729	QRD167J-182	1.8K	1/6W	CARBON	
	R730	QRD167J-182	1.8K	1/6W	CARBON	
	R731	QRD167J-182	1.8K	1/6W	CARBON	
	R732	QRD167J-182	1.8K	1/6W	CARBON	
	R733	QRD167J-155	1.5M	1/6W	CARBON	
	R734	QRD167J-155	1.5M	1/6W	CARBON	
	R735	QRD167J-181	180	1/6W	CARBON	
	R736	QRD167J-181	180	1/6W	CARBON	
	R737	QRD167J-240	24	1/6W	CARBON	
	R738	QRD167J-240	24	1/6W	CARBON	
	R741	QRD167J-105	1M	1/6W	CARBON	
	R742	QRD167J-104	100K	1/6W	CARBON	
	R743	QRD167J-105	1M	1/6W	CARBON	
	R744	QRD167J-104	100K	1/6W	CARBON	
	R751	QRD167J-122	1.2K	1/6W	CARBON	
	R752	QRD167J-122	1.2K	1/6W	CARBON	
	R755	QRD167J-182	1.8K	1/6W	CARBON	
	R756	QRD167J-182	1.8K	1/6W	CARBON	
	R757	QRD167J-224	220K	1/6W	CARBON	
	R758	QRD167J-224	220K	1/6W	CARBON	
	R759	QRD167J-101	100	1/6W	CARBON	
	R760	QRD167J-104	100K	1/6W	CARBON	
	R761	QRD167J-561	560	1/6W	CARBON	
⚠	R762	QRV144F-2700		1/4W	M.FILM	
	R763	QRD167J-155	1.5M	1/6W	CARBON	
	R764	QRD167J-224	220K	1/6W	CARBON	
	R765	QVPE601-104	100K	0.15W	VARIABLE	
	R766	QRD167J-474	470K	1/6W	CARBON	
	R769	QRD167J-564	560K	1/6W	CARBON	
	R776	QRD167J-181	180	1/6W	CARBON	
	R777	QRD167J-152	1.5K	1/6W	CARBON	
	R778	QRD167J-152	1.5K	1/6W	CARBON	
	R779	QRD167J-152	1.5K	1/6W	CARBON	
	R780	QRD167J-105	1M	1/6W	CARBON	
	R781	QRD167J-102	1K	1/6W	CARBON	
	R782	QRD167J-102	1K	1/6W	CARBON	
	R783	QRD167J-471	470	1/6W	CARBON	
	R784	QRD167J-102	1K	1/6W	CARBON	
	R785	QRD167J-102	1K	1/6W	CARBON	
	R786	QRD167J-102	1K	1/6W	CARBON	
	R787	QRD167J-102	1K	1/6W	CARBON	
	R788	QRD167J-221	220	1/6W	CARBON	
	R791	QRD167J-181	180	1/6W	CARBON	
	R792	QRD167J-102	1K	1/6W	CARBON	
	R793	QRD167J-102	1K	1/6W	CARBON	
	R794	QRD167J-102	1K	1/6W	CARBON	
	R801	QRD167J-394	390K	1/6W	CARBON	
	R802	QRD167J-564	560K	1/6W	CARBON	
	R803	QRD167J-123	12K	1/6W	CARBON	
	R804	QRD167J-224	220K	1/6W	CARBON	
	R805	QRD167J-562	5.6K	1/6W	CARBON	
	R806	QRD167J-392	3.9K	1/6W	CARBON	
	R808	QRD167J-103	10K	1/6W	CARBON	
	R809	QRD167J-102	1K	1/6W	CARBON	
	R810	QRD167J-471	470	1/6W	CARBON	
	R811	QRD167J-184	180K	1/6W	CARBON	
	R812	QRD167J-183	18K	1/6W	CARBON	
	R813	QRD167J-273	27K	1/6W	CARBON	
	R814	QRD167J-470	47	1/6W	CARBON	
	R851	QRD167J-684	680K	1/6W	CARBON	
	R852	QRD167J-334	330K	1/6W	CARBON	
	R853	QRD167J-473	47K	1/6W	CARBON	
	R855	QRD167J-393	39K	1/6W	CARBON	
	R856	QRD167J-333	33K	1/6W	CARBON	
	R857	QRD167J-332	3.3K	1/6W	CARBON	
	R858	QRD167J-2R2	2.2	1/6W	CARBON	
	R859	QRD167J-470	47	1/6W	CARBON	
	R871	QRD167J-513	51K	1/6W	CARBON	
	R872	QRD167J-513	51K	1/6W	CARBON	
	R873	QRD167J-683	68K	1/6W	CARBON	
	R874	QRD167J-683	68K	1/6W	CARBON	
	R875	QRD167J-470	47	1/6W	CARBON	
	RA601	QRB045J-472	4.7K	1/8W	R.NETWORK	

⚠ Safety Parts

OTHERS

⚠	ITEM	PART NUMBER	DESCRIPTION	AREA
		EWT011-076	TERMINAL WIRE	
		E11645-302	CIRCUIT BOARD	D
		E11645-302	CIRCUIT BOARD	E
		E70306-001	HEAT SINK	
		E70859-001	EARTH PLATE	
		SBSE3008Z	SCREW	
	J250	QMS6302-131	HEADPHONE JACK	
	L241	EQL4004-1R0	INDUCTOR	
	L251	EQL4004-1R0	INDUCTOR	
	L252	EQL4004-1R0	INDUCTOR	
	L253	EQL4004-1R0	INDUCTOR	
	L254	EQL4004-1R0	INDUCTOR	
	L255	EQL4004-1R0	INDUCTOR	
	L256	EQL4004-1R0	INDUCTOR	
	L401	ENZ3001-002	OSC.COIL	
	L701	EQL4004-1R0	INDUCTOR	
	L702	EQL4004-1R0	INDUCTOR	
	L703	EQL4004-1R0	INDUCTOR	
	L780	EQL4004-1R0	INDUCTOR	
	L783	EQL4004-1R0	INDUCTOR	

OTHERS

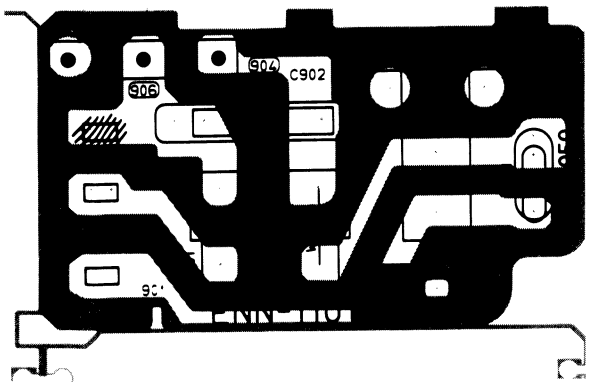
⚠	ITEM	PART NUMBER	DESCRIPTION	AREA
	L784	EQL4004-1R0	INDUCTOR	
	P241	QMS3533-001	MINI JACK	
	P501	EMV5109-010A	PLUG ASSY	
	P502	EMV5109-004A	PLUG ASSY	
	P701	EMN00TV-201A	2P PIN JACK	
	X780	ECX0169-344EA	RESONATOR	
⚠	CP101	ICP-N15	I.C. PROTECTOR	
	FW251	EWR35B-35SST	FLAT WIRE	
	JT101	EMV7122-003Z	CONNECTOR	
	JT102	EMV7122-003Z	CONNECTOR	
	JT203	EMV7122-003Z	CONNECTOR	
	JT401	EMV7122-004Z	CONNECTOR	
	JT402	EMV7122-005Z	CONNECTOR	
	JT404	EMV7122-005Z	CONNECTOR	
	JT405	EMV7122-005Z	CONNECTOR	
	JT503	EMV7122-005Z	CONNECTOR	
	JT505	EMV7122-003Z	CONNECTOR	
	JT506	EMV7122-003Z	CONNECTOR	

⚠: Safety Parts

■ ENN-110 □ Primary PC Board Ass'y

Note: ENN-110 □ Varies according to the areas employed. See note (1) when placing an order.

PC Board Ass'y	Designated Areas
ENN-110 B	U.S.A., Canada
ENN-110 C	Continental Europe, Australia, West Germany
ENN-110 D BS	U.K.
ENN-110 E	U.S. Military Market, Other Countries



CAPACITORS

⚠	ITEM	PART NUMBER	DESCRIPTION			AREA
	C901	QCZ9018-103	0.01MF		CERAMIC	E
	C901	QCZ9038-103	0.01MF		CERAMIC	B
	C901	QCZ9038-103	0.01MF		CERAMIC	C
	C901	QCZ9038-103BS	0.01MF		CERAMIC	DBS
	C902	QFZ9010-223	0.022MF	250V	M.PAPER	C
	C902	QFZ9019-223	0.022MF		M.MYLAR	B
	C902	QFZ9020-223	0.022MF		M.MYLAR	E
	C902	QFZ9020-223BS	0.022MF		M.MYLAR	DBS

OTHERS

⚠	ITEM	PART NUMBER	DESCRIPTION	AREA
		E25950-003	CIRCUIT BOARD	B
		E25950-003	CIRCUIT BOARD	C
		E25950-003	CIRCUIT BOARD	E
		E25950-003BS	CIRCUIT BOARD	DBS
		E65508-002	TAB	
		E67764-203	WRAPPING TERMINAL	
		QSP4C11-E01	PUSH SWITCH	B
		QSP4C11-E01	PUSH SWITCH	C
		QSP4C11-E01	PUSH SWITCH	E
		QSP4C11-E01BS	PUSH SWITCH	DBS
	L901	ENZ5002-005	FILTER	B
	L901	ENZ5002-005	FILTER	C
	L901	ENZ5002-005	FILTER	E
	L901	ENZ5002-005BS	LINE FILTER	DBS

⚠: Safety Parts

OTHERS

⚠	ITEM	PART NUMBER	DESCRIPTION	AREA
		EWT011-076	TERMINAL WIRE	
		E11645-302	CIRCUIT BOARD	D
		E11645-302	CIRCUIT BOARD	E
		E70306-001	HEAT SINK	
		E70859-001	EARTH PLATE	
		SBSE3008Z	SCREW	
	J250	QMS6302-131	HEADPHONE JACK	
	L241	EQL4004-1R0	INDUCTOR	
	L251	EQL4004-1R0	INDUCTOR	
	L252	EQL4004-1R0	INDUCTOR	
	L253	EQL4004-1R0	INDUCTOR	
	L254	EQL4004-1R0	INDUCTOR	
	L255	EQL4004-1R0	INDUCTOR	
	L256	EQL4004-1R0	INDUCTOR	
	L401	ENZ3001-002	OSC.COIL	
	L701	EQL4004-1R0	INDUCTOR	
	L702	EQL4004-1R0	INDUCTOR	
	L703	EQL4004-1R0	INDUCTOR	
	L780	EQL4004-1R0	INDUCTOR	
	L783	EQL4004-1R0	INDUCTOR	

OTHERS

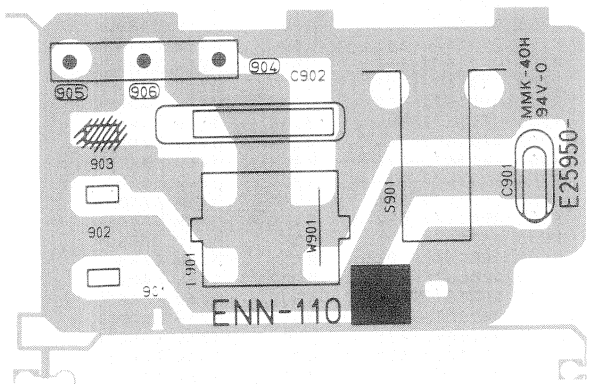
⚠	ITEM	PART NUMBER	DESCRIPTION	AREA
	L784	EQL4004-1R0	INDUCTOR	
	P241	QMS3533-001	MINI JACK	
	P501	EMV5109-010A	PLUG ASSY	
	P502	EMV5109-004A	PLUG ASSY	
	P701	EMN00TV-201A	2P PIN JACK	
	X780	ECX0169-344EA	RESONATOR	
⚠	CP101	ICP-N15	I.C. PROTECTOR	
	FW251	EWR358-35SST	FLAT WIRE	
	JT101	EMV7122-003Z	CONNECTOR	
	JT102	EMV7122-003Z	CONNECTOR	
	JT203	EMV7122-003Z	CONNECTOR	
	JT401	EMV7122-004Z	CONNECTOR	
	JT402	EMV7122-005Z	CONNECTOR	
	JT404	EMV7122-005Z	CONNECTOR	
	JT405	EMV7122-005Z	CONNECTOR	
	JT503	EMV7122-005Z	CONNECTOR	
	JT505	EMV7122-003Z	CONNECTOR	
	JT506	EMV7122-003Z	CONNECTOR	

⚠: Safety Parts

■ ENN-110 □ Primary PC Board Ass'y

Note: ENN-110 □ Varies according to the areas employed. See note (1) when placing an order.

PC Board Ass'y	Designated Areas
ENN-110 B	U.S.A., Canada
ENN-110 C	Continental Europe, Australia, West Germany
ENN-110 D BS	U.K.
ENN-110 E	U.S. Military Market, Other Countries



CAPACITORS

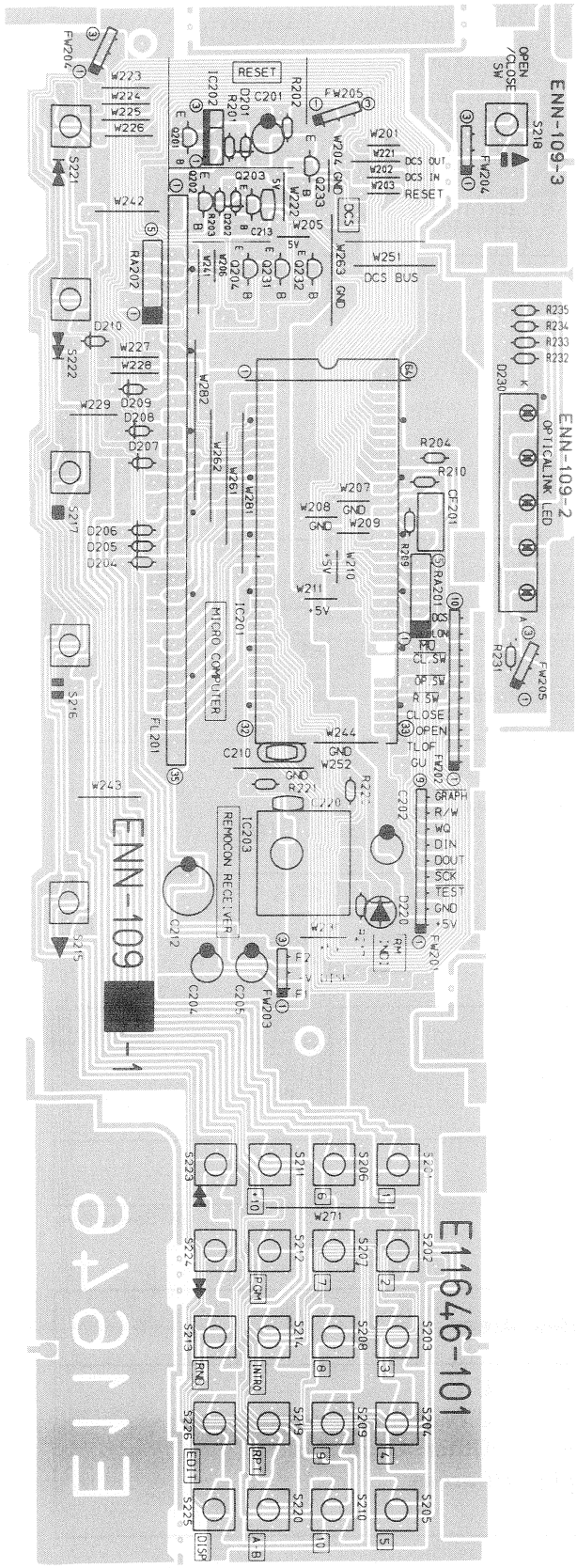
⚠	ITEM	PART NUMBER	DESCRIPTION			AREA
	C901	QCZ9018-103	0.01MF		CERAMIC	E
	C901	QCZ9038-103	0.01MF		CERAMIC	B
	C901	QCZ9038-103	0.01MF		CERAMIC	C
	C901	QCZ9038-103BS	0.01MF		CERAMIC	DBS
	C902	QFZ9010-223	0.022MF	250V	M.PAPER	C
	C902	QFZ9019-223	0.022MF		M.MYLAR	B
	C902	QFZ9020-223	0.022MF		M.MYLAR	E
	C902	QFZ9020-223BS	0.022MF		M.MYLAR	DBS

OTHERS

⚠	ITEM	PART NUMBER	DESCRIPTION	AREA
		E25950-003	CIRCUIT BOARD	B
		E25950-003	CIRCUIT BOARD	C
		E25950-003	CIRCUIT BOARD	E
		E25950-003BS	CIRCUIT BOARD	DBS
		E65508-002	TAB	
		E67764-203	WRAPPING TERMINAL	
		QSP4C11-E01	PUSH SWITCH	B
		QSP4C11-E01	PUSH SWITCH	C
		QSP4C11-E01	PUSH SWITCH	E
		QSP4C11-E01BS	PUSH SWITCH	DBS
	L901	ENZ5002-005	FILTER	B
	L901	ENZ5002-005	FILTER	C
	L901	ENZ5002-005	FILTER	E
	L901	ENZ5002-005BS	LINE FILTER	DBS

⚠: Safety Parts

■ ENN-109 Ⓒ Front PC Board Ass'y



TRANSISTORS

⚠	ITEM	PART NUMBER	DESCRIPTION	MAKER	AREA
	Q201	DTC114YS	SILICON	ROHM	
	Q202	DTA114YS	SILICON	ROHM	
	Q203	DTC144ES	SILICON	ROHM	
	Q204	DTA114YS	SILICON	ROHM	
	Q231	DTA114YS	SILICON	ROHM	
	Q232	DTA114YS	SILICON	ROHM	

I. C. S

⚠	ITEM	PART NUMBER	DESCRIPTION	MAKER	AREA
	IC201	HD614080SC55	I.C.	HITACHI	
	IC202	MN1280(P,Q)	I.C.	MATSUSHITA	

DIODES

⚠	ITEM	PART NUMBER	DESCRIPTION	MAKER	AREA
	D201	1SS133	SILICON	ROHM	
	D202	1SS133	SILICON	ROHM	
	D204	1SS133	SILICON	ROHM	
	D205	1SS133	SILICON	ROHM	
	D206	1SS133	SILICON	ROHM	
	D207	1SS133	SILICON	ROHM	
	D208	1SS133	SILICON	ROHM	
	D209	1SS133	SILICON	ROHM	
	D210	1SS133	SILICON	ROHM	

CAPACITORS

⚠	ITEM	PART NUMBER	DESCRIPTION			AREA
	C201	QETB1AM-107	100MF	10V	ELECTRO	
	C202	QETB1AM-107	100MF	10V	ELECTRO	
	C204	QETB1HM-475	4.7MF	50V	ELECTRO	
	C205	QETB1HM-475	4.7MF	50V	ELECTRO	
	C210	QCHB1EZ-223	0.022MF	25V	CERAMIC	
	C212	QETB1VM-107	100MF	35V	ELECTRO	
	C213	QCBB1HK-101	100PF	50V	CERAMIC	

RESISTORS

⚠	ITEM	PART NUMBER	DESCRIPTION			AREA
	R201	QRD167J-821	820	1/6W	CARBON	
	R202	QRD167J-103	10K	1/6W	CARBON	
	R203	QRD167J-472	4.7K	1/6W	CARBON	
	R204	QRD167J-221	220	1/6W	CARBON	
	R209	QRD167J-105	1M	1/6W	CARBON	
	R210	QRD167J-104	100K	1/6W	CARBON	
	R217	QRD167J-103	10K	1/6W	CARBON	
	R221	QRD167J-223	22K	1/6W	CARBON	
	RA201	QRB045J-473	47K	1/8W	R.NETWORK	
	RA202	QRB045J-104	100K	1/8W	R.NETWORK	

⚠: Safety Parts

OTHERS

⚠	ITEM	PART NUMBER	DESCRIPTION	AREA
		E11646-101	CIRCUIT BOARD	C
		E3400-379	FL SPACER	
	CF201	ECX0004-194KM	RESONATOR	
	FL201	ELU0001-045	FL TUBE	
	FW201	EWR39B-25LST	FLAT WIRE	
	FW202	EWR3AB-25LST	FLAT WIRE	
	FW203	EWR33B-35LST	FLAT WIRE	
	FW204	EWR33B-10SST	FLAT WIRE	
	S 201	ESP0001-016	TACT SWITCH	
	S 202	ESP0001-016	TACT SWITCH	
	S 203	ESP0001-016	TACT SWITCH	
	S 204	ESP0001-016	TACT SWITCH	
	S 205	ESP0001-016	TACT SWITCH	
	S 206	ESP0001-016	TACT SWITCH	
	S 207	ESP0001-016	TACT SWITCH	
	S 208	ESP0001-016	TACT SWITCH	
	S 209	ESP0001-016	TACT SWITCH	
	S 210	ESP0001-016	TACT SWITCH	
	S 211	ESP0001-016	TACT SWITCH	
	S 212	ESP0001-016	TACT SWITCH	

OTHERS

⚠	ITEM	PART NUMBER	DESCRIPTION	AREA
	S 213	ESP0001-016	TACT SWITCH	
	S 214	ESP0001-016	TACT SWITCH	
	S 215	ESP0001-016	TACT SWITCH	
	S 216	ESP0001-016	TACT SWITCH	
	S 217	ESP0001-016	TACT SWITCH	
	S 218	ESP0001-016	TACT SWITCH	
	S 219	ESP0001-016	TACT SWITCH	
	S 220	ESP0001-016	TACT SWITCH	
	S 221	ESP0001-016	TACT SWITCH	
	S 222	ESP0001-016	TACT SWITCH	
	S 223	ESP0001-016	TACT SWITCH	
	S 224	ESP0001-016	TACT SWITCH	
	S 225	ESP0001-016	TACT SWITCH	
	S 226	ESP0001-016	TACT SWITCH	

⚠: Safety Parts

Accessories List

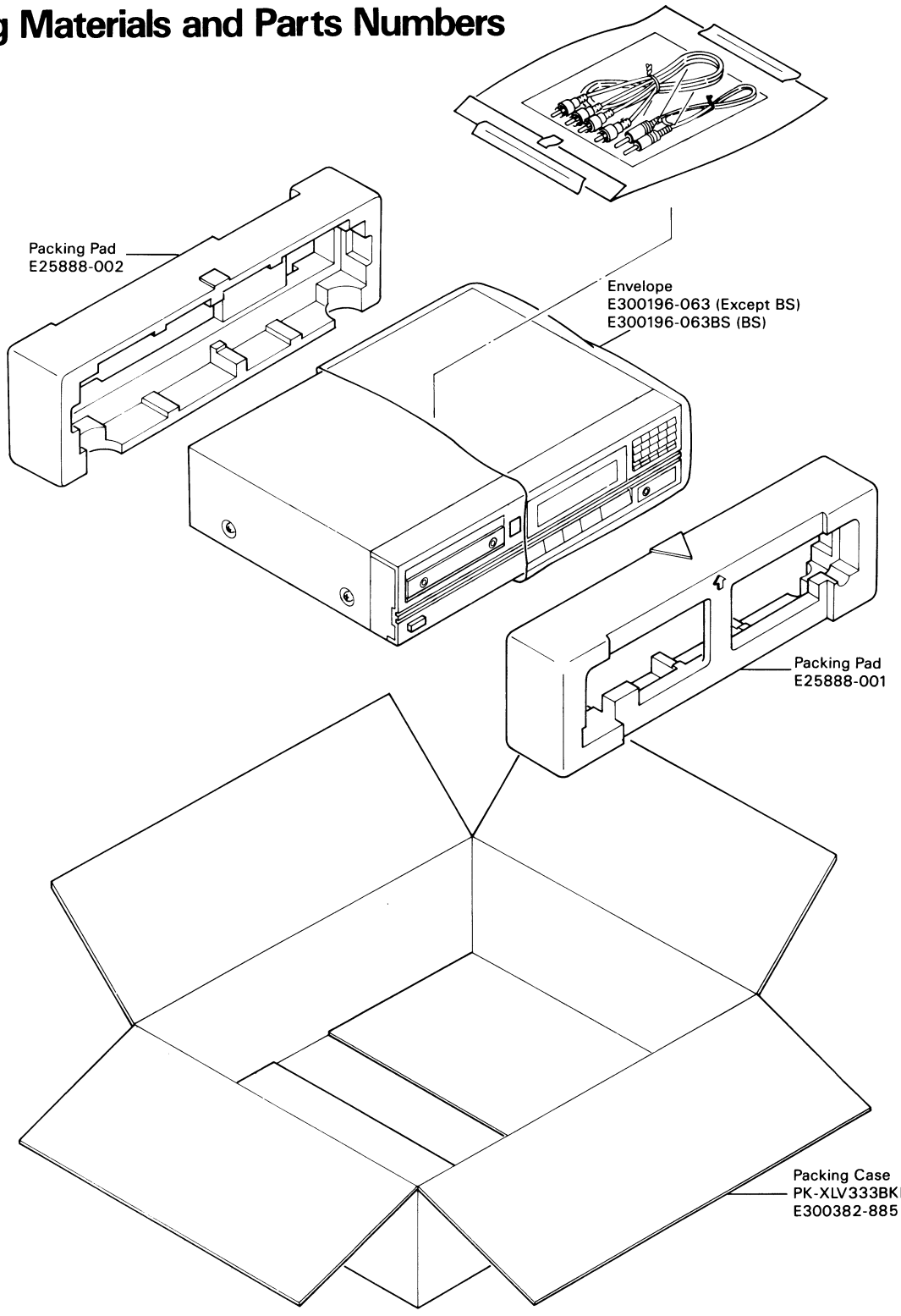
⚠	Part Number	Part Name	Q'ty	Description	Areas
	E30580-1480A	Instruction Book	1		Except BS
	E30580-1480ABS	Instruction Book	1		BS
	BT20025K	Warranty Card	1		C
	BT20029C	Warranty Card	1	for Australia	A
	BT20047C	Warranty Card	1		J, P, PG
	BT20060	Warranty Card	1		BS
	BT20064A	Warranty Card	1		G
	BT20098	Warranty Card	1	for New Zealand	A
	BT20046C	Servise Information	1		J, P, PG
	BT20071A	Service Center List	1		C
	BT20066	EEC Agency	1		G, BS
	BT20044E	Safety Instruction Sheet	1		J
	E300196-010	Envelope	1		Except BS
	E300196-010B	Envelope	1		BS
	E66416-003	Envelope	1		J
	E74737-001	Keeping Card	2		J
	E35497-017	Caution Sheet	1	110V	P
	E35497-019	Caution Sheet	1	220V	U, PG
⚠	E04056	Siemens Plug	1		U, PG
	E43486-340A	BS Safety	1		BS
	EWP302-011	Signal Cord	1		
	EWP805-001	1P Plug Cord	1		

⚠: Safety Parts

The Marks for Designated Areas

J.....U.S.A.	BS.....U.K.
C.....Canada	P,PG.....U.S. Military Market
E,EF.....Continental Europe	U.....Other Countries
A.....Australia	No mark indicates all areas.
G.....West Germany	

Packing Materials and Parts Numbers



The Marks for Designated Areas	
J.....U.S.A.	BS.....U.K.
C.....Canada	P,PG.....U.S. Military Market
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